THE SECOND CHANCE PROJECT

A MULTI-LEVEL EXAMINATION OF SECONDARY PREVENTION PRACTICES FOR SAUDI PEOPLE FOLLOWING A RECENT CARDIAC EVENT

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Abstract

Cardiovascular disease (CVD) is a major health problem in Saudi Arabia as well as in other highly developed countries. Notably, 46% of all deaths in Saudi Arabia occur as a result of CVD (WHO, 2014). The aetiology of CVD within the Saudi population is similar to that of Western countries with atherosclerosis, hypertension, coronary heart disease and diabetes mellitus highly prevalent with the main risk factors being smoking, obesity and physical inactivity.

While there has been a focus on some of the risk factors (smoking and obesity) in Saudi Arabia, there is a paucity of research on secondary prevention practices and the health-related behaviours for Saudi people following a recent cardiac event. This study examined the health-related behaviours of Saudi people following a recent cardiac event, and identified the factors that influence these behaviours, using McLeroy et al.'s (1988) Ecological Model of Health Behaviour as a guiding framework.

The study was conducted in two phases. Phase One employed a quantitative, cross-sectional study design, accessing a sample of 60 cardiac patients from King Fahd Hospital. The aim of Phase One was to verify whether the instruments used to assess health-related behaviours (WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E**) and quality of life (MacNew Heart Disease Health-related Quality of Life) of patients following a recent cardiac event were valid and reliable for a Saudi Arabian population following translation into Arabic. This phase also aimed to verify whether a newly developed audit tool and structured interview schedule were suitable for use in a Saudi Arabian context, and to assess

documented secondary prevention practices provided by Saudi Arabian health services.

Phase Two employed a quantitative, exploratory-descriptive study design, accessing a sample of 300 cardiac patients from King Fahd Hospital. In Phase Two, the verified instruments were used to describe patient knowledge, attitude and behaviours relating to engagement in secondary prevention practices, to describe the current practices in Saudi Arabian health services as documented in their medical records following a recent cardiac event, to identify factors that may influence health-related behaviours, and to describe the health-related quality of life of patients in Saudi Arabia after a cardiac event.

Phase One demonstrated the MacNew questionnaire had adequate reliability and validity in this sample, and confirmed that the WHO-PREMISE, record audit, and structured interview are valid and feasible with some modifications for use in Phase Two of the study. Phase Two highlighted a lack of knowledge and awareness in all aspects of evidence-based guidelines for secondary prevention practices after a cardiac event among the participants in this study. The study also identified that lower level of knowledge of secondary prevention was associated with more negative attitudes toward a healthy lifestyle. Significant relationships were also identified between individual characteristics (age and socio-economic status) and patient's health behaviours, with older patients and patients with lower socio-economic status reporting less engagement in secondary prevention practices. Phase Two of this study also demonstrated that there are gaps between the international evidence-based guidelines for secondary prevention practices for cardiac patients and reported practices in the study setting. These gaps in practices were seen across the hospitalisation encounter, at follow-up and during the ongoing (long-term) prevention periods. The present study suggests that limited provision of health practices relevant to secondary prevention for cardiac patients can influence health behaviour through poor access to the means to develop and support skills for behavioural change.

Phase Two of this study also confirmed the construct validity of the Arabic version of the MacNew Heart Disease Health-related Quality of Life instrument through factor analysis. The original three-factor structure for the Arabic version was confirmed (with loading ≥ 0.40) explaining 58.3% of the total variances. The present study found that the health-related quality of life for the cardiac patients in this study is influenced negatively after a cardiac event. The health-related quality of life scores for the participants in this study were low. In addition, male and younger participants in the present study reported significantly higher health-related quality of life compared to female and older patients.

Overall, this study revealed the importance of developing a secondary prevention program for this population. There was a high prevalence of cardiovascular diseases risk factors. The present study also revealed the importance of a targeted educational approach and increasing the knowledge and awareness among Saudi cardiac patients in aiming to support behavioural change. The present study identified that the knowledge and attitudes of participants were significant factors at an intrapersonal level that influenced their health behaviours. The present study also identified that the services and resources in secondary prevention programs for the participants were also significant predictors at the organisational level with regard to developing and maintaining healthy behaviours. The present study also identified that factors at interpersonal, community and public policy levels were influenced engagement in health-related behaviours. The present study also confirmed the importance of supportive services in all areas, particularly in areas of physical, emotional and social well-being, to improve patients' health-related quality of life.

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List of Abbreviations

ACC	American College of Cardiology
ACS	Acute Coronary Syndrome
AHA	American Heart Association
BMI	Body Mass Index
CABG	Coronary Artery Bypass Graft
CAD	Coronary Artery Disease
CHD	Coronary Heart Disease
CVD	Cardiovascular Disease
HRQL	Health-related Quality of Life
ICC	Intra-Class Correlation Coefficient
ICD	International Classification of Diseases
MacNew	MacNew Heart Disease Health-related Quality of Life Instrument
MENA	Middle East and North African countries
PCA	Principal Component Analysis
PCI	Percutaneous Cardiac Interventions
PREMISE	**P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E**
QLMI	Quality of Life after Myocardial Infarction
RSSM	Resources and Supports for Self-Management
S.A.	Saudi Arabia
SACMOT	Scientific Advisory Committee of the Medical Outcomes Trust
SF-36	Short Form SF-36 health survey

SPACE	Saudi Project for Assessment of Coronary Events
SPSS	Social Package for the Social Sciences
TOE	Transoesophageal Echocardiogram
WHO	World Health Organisation
WHO-PREMISE	See PREMISE

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

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Chapter 1: Introduction

Globally, cardiovascular disease (CVD) is a major cause of morbidity and mortality (World Health Organization [WHO], 2013a). Different factors contribute to the burden of cardiovascular diseases, including unhealthy diet, physical inactivity, tobacco use, hypertension and obesity. However, many CVD risk factors are modifiable and can be controlled through changes in lifestyle and participation in prevention programs. While secondary prevention practices have a significant role in managing these factors, there is limited Saudi Arabian research in the area of the extent to which Saudi Arabian people engage in preventive behaviours. This study seeks to examine the health-related behaviour of Saudi people following a recent cardiac event, and to identify the factors that influence these behaviours. Chapter one provides an overview of the Saudi Arabian context and the rationale for undertaking this study. A brief description of the theoretical framework underpinning the research is provided. The chapter also defines the study purpose and describes the research aims and questions. The significance and scope of this research and definitions of the key terms are also presented to provide context for the present study.

1.1 BACKGROUND AND RATIONALE FOR THE STUDY

The kingdom of Saudi Arabia is located in the Middle East between the Persian Gulf and the Red Sea (WHO, 2014). Saudi Arabia is one of the largest countries in the Middle East with an area of 200 million square kilometres and a population of 27.45 million people of whom, 2.8% are aged 65 years old and over (WHO, 2014).

Saudi Arabia has the largest reserve of petroleum in the world. This wealth of oil has led to massive improvements in socio-economic development with obvious progress in health and the health-care system (Aboul-Enein, 2002; Tumulty, 2001a, 2001b). In the 1950s, the first hospitals in Saudi Arabia were established based on three models: private, public, and military. In 1954, the Ministry of Health was created to be responsible for Saudi Arabia's health-care system. Health-care services in Saudi Arabia are universal and available for every Saudi citizen and every non-Saudi who is working in the public sector (Aldossary, While, & Barriball, 2008). The Ministry of Health provides 60% of health-care services, while other governmental agencies and the private sector offer the other 40% (Aldossary et al., 2008).

In recent years, average life expectancy for the Saudi population has increased to 74 years and the burden of disease has reduced (WHO, 2014). A range of public health programs have been developed in Saudi Arabia to control communicable diseases, including malaria, tuberculosis and HIV (WHO, 2006). Consequently, mortality and morbidity rates from communicable diseases have experienced a significant drop. However, changes in lifestyle amongst the Saudi population have led to an increase in non-communicable diseases, in particular cardiovascular disease and diabetes (WHO, 2006). The most recent WHO statistics for Saudi Arabia identified that in 2014, non-communicable diseases were the major cause of death in Saudi Arabia accounting for 78% of all deaths. Of these deaths from non-communicable diseases, only 3% of deaths were from chronic respiratory diseases, and 5% of deaths were from diabetes, while 46% of deaths were from CVD (WHO, 2014).

CVD is an umbrella term that includes a range of heart and blood vessel diseases. In this study, CVD refers to the group of conditions caused by coronary heart disease. In Saudi Arabia, coronary heart disease (CHD) is considered one of the main health problems and the third highest cause of hospital-based mortality following road traffic accidents and dementia (Kumosani, Alama, & Iyer, 2011). CHD is responsible for 23.98% of all causes of deaths in Saudi Arabia (Kumosani et al., 2011). Thus, CVD and CHD are a significant issue in Saudi Arabia. Preventive strategies are needed to avoid the growth in the burden of this disease and reduce unnecessary health-care expenditure.

In 2003, the Ministry of Health established a range of programs to manage non-communicable diseases, including diabetes, cancer and genetic diseases (WHO, 2006). Although there are clinical management guidelines for hypertension and diabetes in Saudi Arabia, there is no guideline for Saudi cardiac patients. Additionally, although there are 15 heart centres in Saudi Arabia, structured secondary prevention programs including cardiac rehabilitation services, which practice preventive care such as comprehensive risk reduction and long-term care of cardiac patients, are not routinely available (Rawas, Yates, Windsor, & Clark, 2012). More commonly, patients are followed up by a physician in a clinic after they are discharged from hospital. Cardiologists provide oral instructions for exercise, nutrition and medications, although the extent to which such practices are consistent with current evidence regarding secondary prevention is not known (Rawas et al., 2012). The "Sultan Bin Abdulaziz Humanitarian City" is one program available in Saudi Arabia that offers support, education, and therapy services for patients after acute illness, however it is limited to a small number of specialised rehabilitation programs. For example, the programs offered by this health service include an amputee and prosthetics program, a brain injury program, a gait disorder program, and a stroke rehabilitation program (Sultan Bin Abdulaziz Humanitarian City, 2005).

As such, the only CVD patients who benefit from the Sultan Bin Abdulaziz Humanitarian City programs are those who have had a stroke (Sultan Bin Abdulaziz Humanitarian City, 2005).

Previous international research has attempted to develop effective strategies to prevent CVD by determining the behavioural risk factors for these diseases and by implementing public health programs to address these risks (Flynn, McFarlin, & Markofski, 2007; National Heart Foundation of Australia, 2008; National Vascular Disease Prevention Alliance, [NVDPA] 2012). The WHO (2013a) and the Australian Institute of Health and Welfare (2013) have classified cardiovascular risk factors into two categories: those that can be changed, that is, modifiable behavioural risk factors; and those that are inherent, that is, non-modifiable risk factors.

Modifiable risk factors include an unhealthy diet, physical inactivity, tobacco use, hypertension, hypercholesterolaemia, and obesity (Khatib, 2004; NVDPA, 2012). Non-modifiable risk factors include advancing age, male gender, low socio-economic status, and mental ill-health (Australian Institute of Health and Welfare [AIHW], 2014; NVDPA, 2012). Modifiable or behavioural risk factors are considered responsible for about 80% of coronary heart disease and cerebrovascular disease cases worldwide (NVDPA, 2012). Importantly, such behavioural risk factors are potentially modifiable through lifestyle modification and behavioural change toward healthy behaviours (Khatib, 2004; Lloyd-Jones et al., 2009; WHO, 2013a) such as managing lifestyle risk factors through engaging in regular physical activity, avoiding tobacco use, choosing a diet rich in fruit and vegetables, and avoiding foods that are high in fat, sugar and salt (Khatib, 2004; Lloyd-Jones et al., 2009; WHO, 2013a). Numerous studies have indicated that modifying CVD risk factors, such as reducing body weight, quitting smoking, regular exercise and normalisation of blood pressure and cholesterol levels are associated with a decrease in total CVD mortality ranging from 20 to 30% (Brunner, Rees, Ward, Burke, & Thorogood, 2007; Clark, Hartling, Vandermeer, & McAlister, 2005; Davies et al., 2010; Hackam & Spence, 2007; Jolliffe et al., 2001; Lennon, Carey, Gaffney, Stephenson, & Blake, 2008; MacKay-Lyons, Thornton, Ruggles, & Manley, 2010; Mead et al., 2006; Taylor et al., 2004a). In addition, the INTERHEART study demonstrated that modification of CVD risk factors can prevent 90% of the first myocardial infarction incidence (Yusuf et al., 2004).

A number of studies have been conducted in Saudi Arabia to determine the prevalence and frequency of cardiovascular risk factors among the Saudi population (Akbar, Ahmed, & Algamdi, 2003; Al-Nuaim, 1997; Khattab, Abolfotouh, Alakija, Al-Humaidi, & Al-Wahat, 1999; Osman & Al-Nozha, 2000; Taha & Bella, 1998). These studies demonstrate that behavioural risk factors for CVD within the Saudi Arabian community are no different to Western communities, particularly now that Saudi people are adopting lifestyles similar to those in the West (Akbar et al., 2003; Al-Nuaim, 1997; Khattab et al., 1999; Osman & Al-Nozha, 2000; Taha & Bella, 1998).

For example, Siddiqui, Ogbeide, and Al Khalifa (2001) conducted a study on the prevalence of smoking in a Saudi community. This study identified that smoking prevalence is higher among males in Saudi Arabia than was found in other studies. Of the 634 males in this study, 218 (34.9%) were smokers and most knew that smoking was dangerous and carried a risk for CVD. However, Siddiqui et al.'s (2001) study was limited to males only due to socio-cultural restrictions. The study did not include women who, according to some reports, smoke cigarettes and shisha more than males, but just not in public (Sharawi, 2009). In addition, Al-Rukban's

(2003) study demonstrated that Saudi adolescents are likely to be more obese in comparison with American adolescents. This is thought to be due to changes in social and behavioural patterns in this group.

While some studies in Saudi Arabia have focused on the prevalence of behavioural risk factors for CVD such as obesity and smoking (Al-Nozha et al., 2005; Al-Rukban, 2003; Siddiqui, Ogbeide, & Al Khalifa, 2001), there is limited research in the Saudi context that addresses self-management issues or the effects of engagement in preventive behaviours. This is despite strong evidence that CVD behavioural risk factors can be modified through effective programs and services to prevent complications or recurrent cardiovascular events (Khatib, 2004; Lloyd-Jones et al., 2009; WHO, 2013a). As there is limited information regarding the extent to which Saudi people engage in these programs, this study seeks to understand the health-related behaviours of Saudi people following a recent cardiac event and the factors that influence the behaviours of Saudi cardiac patients toward engaging with secondary prevention practices.

Secondary prevention of CVD refers to health-care designs that aim to prevent the recurrence of CVD events and complications of CVD in patients who have CVD (Piepoli et al., 2010). Various international studies have reported that using aspirin, beta-blockers, angiotensin converting enzyme inhibitors (ACEI), lipid lowering drugs, and anti-hypertensive drugs all reduce the incidence of recurrent CVD events (Al-Mallah, Tleyjeh, Abdel-Latif, & Weaver, 2006; Aronow et al., 2001; Ellis, Tcheng, Sapp, Topol, & Lincoff, 2003; Foody et al., 2006; Hassan & Amonkar, 2001; Schwartz et al., 2001; Walsh & Pignone, 2004; Yzebe & Lievre, 2004). In addition, non-pharmacological interventions consisting of modifying lifestyles related to patient risk behaviours, such as ceasing smoking engaging in regular physical exercise and consuming a healthy diet, can reduce cardiovascular mortality in people with a prior cardiac event (Brunner et al., 2007; Clark et al., 2005; Davies et al., 2010; Hackam & Spence, 2007; Jolliffe et al., 2001; Lennon et al., 2008; MacKay-Lyons et al., 2010; Mead et al., 2006; Taylor et al., 2004).

Previous systematic reviews on CVD have focussed on cardiac rehabilitation programs as an important source of services that are necessary to achieve secondary prevention goals (Balady et al., 2007; Braunwald et al., 2002; Clark et al., 2005; Leon et al., 2005; Thomas et al., 2007). Cardiac rehabilitation services are recommended for patients who have had one or more of the following conditions as a primary diagnosis: coronary artery disease-related conditions (MI/acute coronary syndrome, CABG, PCI, stable angina); heart valve surgical repair or replacement; and heart or heart/lung transplantation (Thomas et al., 2007). Cardiac rehabilitation services are typically provided in three phases: inpatient, early outpatient and long-term outpatient/ongoing prevention. Such services involve different components such as patient assessment, risk factor modification, exercise programs, health education and counselling, behaviour modification strategies and support for self-management (Thomas et al., 2007). Importantly, secondary prevention strategies, including cardiac rehabilitation services, have been associated with reduced hospital re-admission rates and recurrent cardiovascular events, accelerated recovery, improved symptom management, and improved quality of life (Clark et al., 2005; Thomas et al., 2007). Improving quality of life for cardiac patients is one of the major goals of secondary prevention and cardiac rehabilitation services.

There is evidence suggesting that patients' quality of life is affected after a cardiac event (Hodges, Kirby, Solanki, O'Donnell, & Brodie, 2007; I. Johansson, Karlson, Grankvist, & Brink, 2010; P. Johansson et al., 2010; Keyes, 2004; Lane, Carroll, Ring, Beevers, & Lip, 2001; Li et al., 2008; Strik, Denollet, Lousberg, & Honig, 2003; White & Groh, 2007; Whooley, 2006). These studies identify a relationship between quality of life and physical and psychological health, and sexual dysfuntion for patients post cardiac events.For example, Strik et al. (2003) reported that among patients assessed for emotional distress one month post-MI, both depression and anxiety were significantly associated with the cardiac event. Moreover, symptoms of anxiety were identified to be a more significant predictor of cardiac death or recurrent MI than depression (Strik et al., 2003). Other studies have confirmed that there is a relationship between erectile dysfunction and cardiovascular disease (Hodges et al., 2007). Hodges et al. (2007) noted that 66% of men experiencing a cardiac event suffered from erectile dysfunction in different stages of severity which may have an impact on an individual's and partner's health-related quality of life. However, there is little Saudi data available that measures patient characteristics, including health-related quality of life after a cardiac event (Hodges et al., 2007; I. Johansson et al., 2010; Keyes, 2004; Lane et al., 2001; Li et al., 2008; Strik et al., 2003; White & Groh, 2007; Whooley, 2006).

This study addresses, therefore, a number of gaps in knowledge about CVD in Saudi Arabia. While previous research has provided evidence of the effectiveness of both pharmacological and non-pharmacological interventions for secondary prevention of CVD (Al-Mallah et al., 2006; Davis et al., 2006; Ellis et al., 2003; Hassan & Amonkar, 2001; MacKay-Lyons et al., 2010; National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand (2008); Wenger, 2008; WHO, 2007; Yzebe & Lievre, 2004), less attention has been directed at how such interventions effect the Saudi Arabian population.

Thus, this study will examine the health-related behaviours for Saudi people following a recent cardiac event, and identify the factors that influence these behaviours. The first objective of this study is to describe patient knowledge, attitudes and behaviours associated with engagement in secondary prevention practices following a cardiac event. The second objective is to describe current secondary prevention practices in Saudi Arabian health services for patients following a recent cardiac event within the previous three to six months, as documented in medical records. The third objective is to identify factors that may influence health-related behaviours for this population. The fourth objective is to describe health-related quality of life of patients in Saudi Arabia who have had a recent cardiac event.

1.2 THE THEORETICAL FRAMEWORK

The McLeroy, Bibeau, Steckler, and Glanz (1988) Ecological Model of Health Behaviour was selected as the theoretical framework for this study and it considers multiple levels of influences that have effects on health behaviours. Ecological models of health behaviour enable a better understanding of how people interact with their environments, which can be used to develop effective multilevel approaches to improve health behaviour. Such models propose that any individual behaviour is influenced by multiple levels, including intrapersonal, interpersonal, organisation, community, and public policy levels. This comprehensive approach can lead to the development of interventions that are responsive to multiple influences on behaviour. McLeory et al.'s (1988) Ecological Model of Health Behaviour has been selected for the current study for a number of reasons. Of relevance to this study is that the model was developed to apply specifically to an understanding of health behaviour (e.g. physical activity and healthy diet). This model has guided success in reducing health problems and identified health behavioural issues such as tobacco use determinants (Sallis et al., 2008). In addition, the model has been widely used in health education and health promotion research. Moreover, it is considered as the central theme of a new approach in public health (Sallis et al., 2008).

There are four core principles identified in McLeroy et al.'s (1988) Ecological Model of Health Behaviour. Firstly, there are multiple levels of factors influencing specific health behaviours, including intrapersonal, interpersonal, organisation, community, and public policy levels. Secondly, influences on behaviour interact across these different levels. Thirdly, given these multiple influences, multi-level interventions should be most effective in changing behaviour. Lastly, ecological models should be behaviour-specific, identifying the most relevant potential influences at each level.

The theoretical framework for the present study is adapted from McLeroy et al.'s (1988) model and informed by a literature review on secondary prevention practices for CVD.

1.3 PURPOSE

The overall purpose of this study is to examine the health-related behaviour for Saudi people following a recent cardiac event, and to identify the factors that influence these behaviours. The first objective of the study was to describe patient knowledge, attitudes and health behaviours relating to engagement in secondary prevention practices following a cardiac event (intrapersonal level). The second objective of the study is to describe the current practices in Saudi Arabian health services for patients following a recent cardiac event within the previous three to six months as documented in medical records (organisational level). The third objective is to identify factors related to the interpersonal, community and public policy levels that may influence health-related behaviours for this population. The fourth objective is to describe health related quality of life of patients in Saudi Arabia who have had a recent cardiac event.

In order to achieve these objectives this research was conducted in two phases. Firstly, Phase One evaluated the validity and reliability of the two instruments that were used to assess health-related behaviour and health-related quality of life of Saudi patients following a recent cardiac event. These instruments are the WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** questionnaire (Mendis et al., 2005) and the MacNew Heart Disease Health-related Quality of Life questionnaire (Valenti et al., 1996). Phase One also examined whether the audit tool and the structured interview proposed for Phase Two were suitable for the Saudi Arabian context to evaluate current secondary prevention practices. Phase Two involved a cross sectional survey of patients to describe patient knowledge, attitudes and behaviours associated with participation in secondary prevention practices using the WHO-PREMISE questionnaire. Phase Two also described the documented secondary prevention practices through an audit of practices noted in the patient medical records and also through undertaking a structured interview with patients. Phase Two also identified factors related to interpersonal, community and public policy levels that may influence health-related behaviours through survey and analysis of the literature. The survey also described patients' health-related quality of life, using the MacNew Heart Disease Health-related Quality of Life questionnaire.

1.3.1 Research Aim and Objectives for Phase One

Aim

The overall aim of Phase One was to evaluate the validity and reliability of the instruments that were used to assess the health-related behaviour and quality of life of Saudi patients following a recent cardiac event and secondary prevention practices that are provided in Saudi Arabian health services for patients after a recent cardiac event.

Objectives

1. To verify whether the WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** questionnaire is a valid questionnaire after translation into Arabic.
2. To verify whether the audit tool and a structured interview to be used in the main study are suitable for the Saudi Arabian context in the assessment of secondary prevention CVD practices following a recent cardiac event.
3. To verify whether the MacNew Heart Disease Health-related Quality of Life Instrument questionnaire is a valid and reliable instrument after translation into Arabic.

Research questions

1. Is the WHO-PREMISE questionnaire a valid instrument to identify patients' knowledge of and attitudes towards participation in secondary prevention practices in a Saudi population?

2. Is the audit tool valid and feasible for assessing secondary prevention practices provided by Saudi Arabian health services following a recent cardiac event?
3. Is the structured interview schedule valid for providing additional data for assessing the level of secondary prevention practices provided by Saudi Arabian health services?
4. Is the MacNew questionnaire a valid health-related quality of life instrument for measuring the patient's perceived quality of life?

1.3.2 Research Aim and Objectives for Phase Two

Aim

The aim of Phase Two is to examine the health-related behaviours of Saudi people following a recent cardiac event, and to identify the factors that influence these behaviours.

Objectives

1. Describe patient knowledge, attitudes and behaviours relating to engagement in secondary prevention practices at an intrapersonal level, using the WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** questionnaire.
2. Describe the current practices in Saudi Arabian health services at the organisational level as documented in their medical records following a recent cardiac event.
3. Examine the influence of factors at the interpersonal, community and public policy levels on health-related behaviours.

4. Describe the health-related quality of life of patients in Saudi Arabia after a cardiac event, using the MacNew Heart Disease Health-related Quality of Life questionnaire.
5. Identify the relationships between quality of life and individual demographic factors, such as age, education, gender, income, and smoking status.
6. Identify the relationships between patients' quality of life and patients' knowledge and attitudes towards secondary prevention practices.
7. Identify the relationships between patient knowledge and individual demographic factors, including age, education, gender, income and smoking status.

Research questions

1. What are the demographic characteristics of Saudi Arabian cardiac patients?
2. What are cardiac patients' knowledge of, and attitudes and health behaviour towards participation in secondary prevention practices in Saudi Arabia?
3. What are the health care practices provided in Saudi Arabian health services for cardiac patients following a recent cardiac event?
4. What are the factors that influence health-related behaviours of Saudi Arabian cardiac patients?
5. What is the self-reported health-related quality of life for Saudi patients after a cardiac event?

6. What are the associations between quality of life and individual demographic factors (age, education, gender, income, and smoking)?
7. What are the associations between patient's knowledge and individual demographic factors (age, education, gender, income, and smoking)?

1.4 SIGNIFICANCE AND SCOPE

While CVD is considered a health problem in Saudi Arabia as it is in Western countries and there are similar risk factors, the situation in Saudi Arabia for patients after a cardiac event has not been described in the literature. This study draws on several sources of data to identify the health-related behaviours for Saudi people following a recent cardiac event, and to identify the factors that influence these behaviours. The findings of this study will provide data to improve care and outcomes for Saudi patients and assist in developing behavioural interventions by understanding factors that influence engagement in secondary prevention programs. Findings will be used to develop recommendations for improving the quality of life of post-cardiac event survivors by increasing the awareness of patients about secondary prevention practices, and identifying strategies to overcome barriers to secondary prevention practices in Saudi Arabia.

1.5 DEFINITION OF TERMS

The conceptual and operational definitions of key terms relevant to the study are described below.

Secondary prevention

Conceptual definition: Secondary prevention is defined as prevention that comes after the disease has developed. It aims to prevent recurrence of the disease and morbidity and mortality (Gholizadeh, 2008).

Operational definition: Secondary prevention practices in this study refer to health care interventions that aim to prevent the recurrence of a cardiovascular event or complications of the disease in patients with CVD, through cardiac rehabilitation services. These practices include both pharmacological and non-pharmacological interventions.

Cardiac event

Conceptual definition: The term ‘cardiac event’ has been used in various studies to include various heart conditions. Gholizadeh (2008) uses the term cardiac event to refer to conditions including: myocardial infarction, angina pectoris, unstable angina, congestive heart failure and sudden cardiac death.

Operational definition: Cardiac event in this study refers to one or more of the following International Classification of Diseases (ICD-9-CM) (2011) coded heart conditions or procedures within the previous six months:

- 410 Acute myocardial infarction (410.0 – 410.9)
- 413 Angina pectoris (413.0, 413.1, 413.9)
- 36 Operations on vessels of heart (36.0, 36.1, 36.2, 36.3, 36.9)

- 411 Other acute and subacute forms of ischemic heart disease (411.0, 411.1, 411.8, 411.81, 411.89).

Health behaviour

Conceptual definition: Health behaviour is defined as "those personal attributes such as belief, expectations, motives, values, perceptions, and other cognitive elements; personality characteristics, including affective and emotional states and traits; and overt behaviour patterns, actions, and habits that relate to health maintenance, to health restoration, and to health improvement" (Gochman, 1982, P. 169).

Operational definition: Health behaviour of cardiac patients in this study was examined at the intrapersonal level by using the WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** questionnaire, at the organisational level by using the audit tool and structured interview instruments, and at interpersonal, community and public policy levels by using literature review.

Quality of life

Conceptual definition: Quality of life is a multidimensional construct of important aspects of life including emotional, physical, and health outcomes (Kane, 2003).

Operational definition: Quality of life of Saudi Arabian patients following a recent cardiac event, including physical, emotional and social well-being, was measured in this study by using the MacNew Heart Disease Health-related Quality of Life Instrument.

1.6 THESIS OUTLINE

This chapter has provided the background, rationale and the theoretical framework for this research. The research aim and objectives have been described. The study questions, and the significance, scope, and key terms relevant to the study have been presented.

Chapter 2 provides a review of the literature on the Saudi Arabian health context, the global impact of CVD, and risk factors for CVD. Evidence-based practices for the secondary prevention of CVD and health-related quality of life for cardiac patients are also reviewed in this chapter. A review of literature on the theoretical framework underpinning this research is also presented in this chapter. Chapter 3 describes the design adopted by this research to achieve the study aim and objectives. Data collection procedures and analysis for Phase One and Phase Two are also presented. Chapter 4 reports the results of Phase One of the research. The chapter presents findings relating to pilot testing of the study instruments Chapter 5 reports the results of Phase Two of the research. Chapter 6 presents an integrated discussion of key findings from the research. An interpretation of the findings from Phase Two of the study is presented and discussed with reference to past research and relevant literature. Chapter 7 presents implications and recommendations for future research and clinical practice based on the findings. Finally, the limitations of this study are discussed and the conclusions from this study are outlined.

Chapter 2: Literature Review

2.1 INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death throughout the world (WHO, 2013a). Cardiovascular diseases refer to diseases of the heart and blood vessels in the body, and thus can affect the brain (stroke), heart (heart attack), pancreas (diabetes), kidneys (renal failure and dialysis), and legs (ulcers and claudication) (WHO, 2013b). There are a number of diseases within the classification of cardiovascular disease all of which can have a direct effect on the heart. These include hypertension, coronary heart disease, rheumatic heart disease, congenital heart disease and heart failure (WHO, 2013b). In this research, CVD refers to the group of conditions caused by coronary heart disease (CHD). CHD is considered one of the main health problems in Saudi Arabia and is responsible for 23.98% of deaths annually (Kumosani, Alama & Iyer, 2011).

This chapter will critically review literature relating to the impact of cardiovascular disease worldwide with a major focus on CHD. A review of the evidence relating to secondary CVD prevention will also be undertaken. This literature review is divided into six sections starting with a description of the global impact of CVD. This chapter will also examine risk factors for cardiovascular disease. This will be followed by an examination of the assumption that CVD risk factors for the Saudi population are the same as those for Western countries. This section highlights findings from Saudi studies examining factors that increase the risk of the Saudi population having CVD. This review then turns to discuss the evidence that both pharmacological and non-pharmacological interventions are effective for secondary prevention after a cardiac event. This section in the literature review examines the limitations of Saudi studies which have examined practices for secondary CVD prevention. This review moves on to analyse the health-related quality of life for survivors of a cardiac event. It suggests that the quality of life for patients after a cardiac event can be associated with depression and anxiety, sexual dysfunction and relationship disturbances. Finally, a review of literature related to the Ecological Model of Health Behaviour will be presented.

2.2 THE GLOBAL IMPACT OF CVD

CVD is a leading cause of death throughout the world and is also the primary cause of women's deaths (Shara, 2010; WHO, 2013a). In 2008, throughout the world, it was estimated that 17.3 million people died from CVD and by 2030 it is estimated that 23.3 million people will die from CVD each year (WHO, 2011). In 2009, CVD was the cause of 1 out of every 4 deaths in the United States, and each year 600,000 Americans died of CVD (Go et al., 2013). In 2009, an estimated 715,000 Americans had a coronary event and it is predicted that 475,000 (50%) of these will have a recurrent or second heart attack (Go et al., 2013).

In comparison, in 2014, the Australian Institute of Health and Welfare (AIHW) reported that CVD was a factor impacting on the health status of 3.4 million Australians and that 48,456 die annually from CVD (AIHW, 2014). In this same period, CVD was responsible for 18% of the overall burden of disease in Australia (AIHW, 2014).

2.3 CVD RISK FACTORS

A number of studies have confirmed the risk factors associated with CVD which have led to the development of strategies and health programs for prevention of such diseases (Flynn et al., 2007; National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand, 2012; NVDPA, 2012). Cardiovascular risk factors have been classified into two categories: modifiable risk factors and non-modifiable risk factors (NVDPA, 2012). Modifiable risk factors are factors that can be changed, including an unhealthy diet and obesity, physical inactivity, tobacco use, hypertension, and hypercholesterolemia (Khatib, 2004; NVDPA, 2012). Non-modifiable risk factors refer to factors such as low socio-economic status, mental ill-health, advanced age, male gender, and family history of premature CVD (NVDPA, 2012). Studies suggest that modifiable risk factors are responsible for about 80% of coronary heart disease and cerebrovascular disease cases (WHO, 2013a; Lloyd-Jones et al., 2009) (Figure 2.1). These studies also suggest that such risk factors can be modified through behavioural change (Khatib, 2004; Lloyd-Jones et al., 2009; WHO, 2013a).

There is strong evidence that links health behaviour with cardiovascular health (Åkesson et al., 2007; Chiuve et al., 2006; Hu et al., 2000; Khaw et al., 2008; Stampfer et al., 2000). This evidence demonstrated that an individual's health behaviours are significantly associated with improvements in their levels of cholesterol, blood pressure, blood glucose and the general medical outcomes (Åkesson et al., 2007; Chiuve et al., 2006; Hu et al., 2000; Khaw et al., 2008; Stampfer et al., 2000). From a study of 84,129 healthy middle-aged women, five healthy behaviour factors were assessed (non-smoker, having a BMI < 25kg/M^2, being physically active, having a healthy diet and drinking from one half to one glass

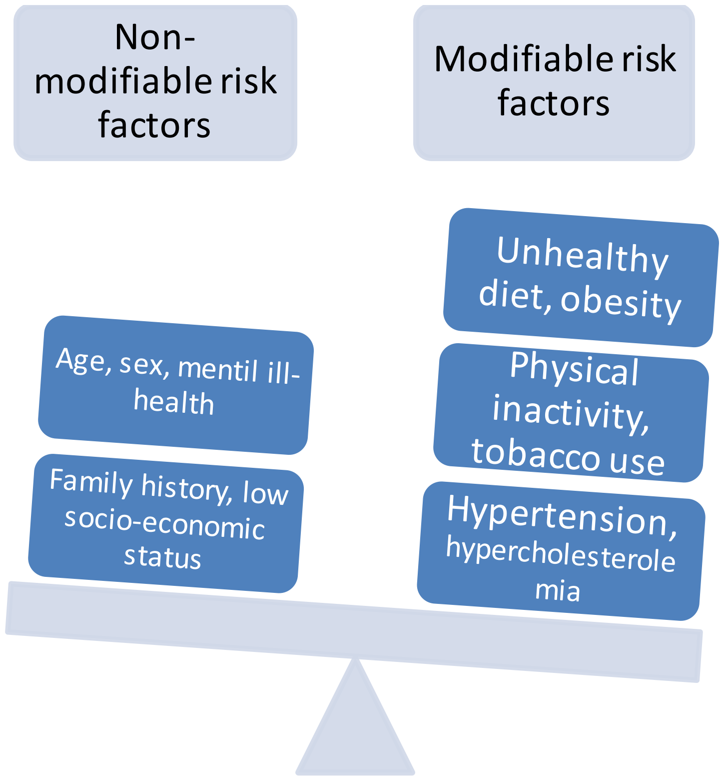

Figure 2.1. Cardiovascular disease risk factors

of wine daily) and the incidence of coronary heart disease events was monitored prospectively during 14 years of follow-up (Stampfer et al., 2000). The study found that women having three, four, or all five health behaviours, had lower risks of an incidence of CHD by 57%, 66% and 83%, respectively (Stampfer et al., 2000). Similar, outcomes were observed in a study of 42,847 healthy middle aged males, where the same five healthy behaviours were assessed and the incidence of CHD was ascertained prospectively over 16 years of follow-up (Chiuve et al., 2006). The study identified that men with one, two, three, four, or all five health behaviours respectively, had a 54%, 63%, 71%, 78% and 87% lower risks of CHD respectively. This study also found that the strong association between health behaviour and the incidence of CHD were very similar for participants who received medical treatments for hypertension or high cholesterol and those who did not (Chiuve et al., 2006). The pharmacological treatments in this study, therefore, did not alter the importance of lifestyle (Chiuve et al., 2006). Findings from previous studies, thus, provide evidence that healthy behaviours reduce the incidence of cardiac events, and their mortality and morbidity.

In 2010, the American Heart Association (AHA) identified a goal for 2020, which is to reduce CVD deaths and improve cardiovascular health in the USA (Lloyd-Jones et al., 2010). The AHA published a strategic plan to achieve the goal for 2020 through targeting health behaviours (not smoking, exercise and fruit and vegetable consumption) and health factors (ideal body mass index [BMI], cholesterol, blood pressure and blood glucose) (Lloyd-Jones et al., 2010). More recently, in 2013, the AHA adopted the 2020 goal and expanded their goals to reduce CVD death by 20% and improve cardiovascular health by 20% (Spring et al., 2013). The AHA emphasises preventing cardiovascular diseases by addressing the individual's health behaviour. The AHA highlighted that there are three new facilitators for 2020 goal achievement (Spring et al., 2013). First, maintaining cardiovascular health can be achieved through promoting healthy lifestyle behaviour. Second, treating unhealthy behaviours (smoking, physical inactivity) and high risk biomarkers (high blood pressure) will also help to achieve the 2020 goal. Third, a combination of strategies at both the individual level and the population level is required to help the public improve their cardiovascular health (Spring et al., 2013). Therefore, one may extrapolate that addressing the health-related behaviour of Saudi Arabian people after a cardiac event is necessary to improve their cardiovascular health. In addition, identifying factors that influence these behaviours at different levels could assist in developing strategies at individual, community and policy levels.

2.4 CVD RISK FACTORS FOR THE SAUDI POPULATION

There is no substantial difference in behavioural risk factors between the Saudi and Western populations (Akbar et al., 2003; Al-Nuaim, 1997; Khattab et al., 1999; Osman & Al-Nozha, 2000; Taha & Bella, 1998). As in Western countries, Saudi Arabia has seen an increase in the prevalence of behavioural lifestyle risk factors, such as obesity and physical inactivity. In addition, smoking rates have also risen to levels which are higher than those in Western countries, particularly for young females (Siddiqui et al., 2001). The INTERHEART study is the largest case-control study in the cardiovascular field, which was conducted to gain knowledge about the effect of modifiable risk factors on the risk of coronary heart diseases in most regions of the world (Yusuf et al., 2004). This study involved 27,000 patients with acute myocardial infarction in 52 countries. The study found that abnormal lipids, smoking, hypertension, diabetes, abnormal obesity, lack of consumption of fruit and vegetables and lack of regular physical activity explained 95% of acute myocardial infarction events in Middle Eastern countries, including Saudi Arabia (Yusuf et al., 2004). Mehio Sibai and colleagues (2010) conducted another study in the Middle East and North African countries (MENA), including Saudi Arabia to examine the prevalence rates of CVD risk factors. This study suggested that prevalence rates of all the major cardiovascular risk factors were high in Middle East and North African countries. In particular, Saudi Arabia was identified as having the highest prevalence of obesity, diabetes, hypercholesterolemia and physical inactivity rates amongst the MENA countries (Mehio Sibai et al., 2010).

Recently, the Saudi Project for Assessment of Coronary Events (SPACE) registry was conducted to study the clinical features, management, and in-hospital outcomes of acute coronary syndrome patients (AlHabib et al., 2011). This project included 17 hospitals from different regions in Saudi Arabia with 5,055 Acute Coronary Syndrome (ACS) patients. The study suggested that all major CVD risk factors are increasing in Saudi Arabia, including diabetes, hypertension, smoking and hyperlipidaemia. However, the prevalence rate of diabetes mellitus was the highest among the ACS patients (58%) (AlHabib et al., 2011). Another community-based study was conducted in Saudi Arabia to identify the prevalence of CVD risk factors among coronary artery disease patients (Al-Nozha et al., 2004). Al-Nozha and colleagues (2004) found that hypercholesterolemia rates were the highest prevalence of CVD risk factors for coronary artery disease (CAD) patients in Saudi Arabia (Al-Nozha et al., 2004).

Having reviewed the CVD risk factors for the Saudi population that are associated with cardiovascular diseases in general, the next section will present a review of literature in detail related to behavioural risk factors, including smoking, obesity and physical inactivity in Saudi Arabia.

2.4.1 Smoking

Smoking is considered a global epidemic and is amongst the world's biggest public health problems. It is also one of the most important factors that contribute to the mortality and morbidity of many diseases, including cardiovascular disease and cancer (Al-Turki et al., 2010). It has been confirmed that there is a clear association between smoking and coronary artery disease (CAD) (Al-Nozha et al., 2009). Inoue (2004) demonstrated the effect of smoking on CVD risk factors through the enhancement of platelet functions. Platelet activation by smoking is linked to thrombosis formation, including onset of myocardial infarction (Inoue, 2004). In 2013, throughout the world, it was estimated that there were nearly 6 million deaths annually from tobacco consumption. There will be more than 8 million deaths from tobacco consumption annually in 2030, 80% of them being from developing countries (WHO, 2013b). In fact, although the prevalence of smoking in developed countries has been declining by 1% annually, the trend is rising by 2% in developing countries (Al-Turki et al., 2010). More specifically, statistics from different studies conducted in Saudi Arabia show that the prevalence of tobacco consumption in different age groups varies from 11.6% to 34.4% (Al-Damegh, Saleh, Al-Alfi, & Al-Hoqail, 2004; Al-Faris, 1995; Al-Yousaf & Karim, 2001; Jarallah, Al-Rubeaan, Al-Nuaim, Al-Ruhaily, & Kalantan, 1999; Sabra, Taha, Al Sebiany, Al Kurashi, & Al Zubier, 2007; Siddiqui et al., 2001). This variation is due to differences in research design, methodology, and the age group studied (Abdalla, Al-Kaabba, Saeed, Abdulrahman, & Raat, 2007).

In the past two decades, a range of studies have investigated the extent of the smoking problem in Saudi Arabia and the prevalence of tobacco consumption (Abolfotouh et al., 1998; Al-Faris, 1995; Jarallah et al., 1999; Saeed, Khoja, & Khan, 1996). For example, Saeed et al (1996) found that the prevalence of smoking was 25.3% among Saudi adults in Riyadh city. Additionally, the proportion of regular smokers among university students has been investigated (Jarallah et al., 1999; Taha, Bener, Noah, Saeed, & Al-Harthy, 1991). In one study, 33% of the male medical college students in King Saud University were current smokers (Jarallah, 1999). Similarly, 37% of students from another college in the same university were current smokers (Taha et al., 1991) In Riyadh city, 38% of male physicians and 16% of female physicians have been reported to be current smokers (Saeed, 1990; Saeed, Taha, & Al Shehri, 1989).

Results from these previous studies reveal that the higher smoking prevalence and daily cigarette consumption were associated with being male, single, and being more highly educated. Additionally, the reasons for being smokers were reported to be relieving psychological tension, wasting time, imitation and enjoyment (Abolfotouh et al., 1998; Al-Faris, 1995; Jarallah et al., 1999; Saeed et al., 1996).

Recent studies have been focused on the most common methods of tobacco use. These studies have shown that there is a high smoking prevalence, daily cigarette consumption, and hubbly-bubbly "shisha" in Saudi Arabia (Siddiqui et al., 2001). Hubbly-bubbly has a different terminology depending on the region where it is used (Maziak, Ward, Afifi Soweid, & Eissenberg, 2004; Shafagoj & Mohammed, 2002). For example, Egypt and Saudi Arabia use "shisha", "boory", "goza" or "water pipe", whereas Israel, Jordan, Syria, and Lebanon call it "narghil", "nargile", or "arghile". The shisha consists of a head which holds tobacco during the smoking session, a hose that allows smoke to be drawn, a body, and a water bowl which is placed in the bottom of the shisha and contains the water through which the tobacco smoke passes before going to the hose which makes the smoke moist (Figure 2.2). There are different types of tobacco used in shisha but the most common ones are sweet and flavoured, such as apple and cappuccino, and it is called Maassel (Maziak et al., 2004).

Shisha is usually practiced in groups and it is the centre of a social activity of conversation and passing time. The hose of the shish is passed from person to person, and the same mouthpiece is usually used by all of the participants. Most smoking sessions last 45 to 60 minutes but may also continue for several hours (Knishkowy &

Figure 2.2. Hubbly-bubbly

Amitai, 2005). It has been claimed that > 100 million people worldwide smoke water pipes daily (Knishkowy & Amitai, 2005).

In Arab countries, studies report that teenage females are more influenced by changes in lifestyle in the area of smoking than teenage males (Abdalla et al., 2007; Sharawi, 2009), as shisha is seen to be more prestigious than cigarette smoking. Additionally, these studies suggest that the gap in smoking prevalence between the males and females is narrowing due to the increase of women and girls who currently smoke (Abdalla et al., 2007). A cross-sectional study of 1,100 females was conducted in Jeddah city in Saudi Arabia to determine the prevalence of tobacco smoking among female students in the colleges of Medicine, Dentistry, and Art and Science (Merdad, Al-Zahrani, & Farsi, 2007). The study identified that although 90% of students were aware of the relationship between smoking and heart disease, the prevalence of smoking was 11%. A total of 5% of the sample were cigarette smokers, 8.7% used a water pipe (shisha) and other tobacco products, while 2.7%

smoked both cigarettes and other tobacco products (Merdad et al., 2007). Interestingly, this study reported a significant relationship between the prevalence of smoking, higher family socio-economic status, and having a parent or friend who smokes.

Moreover, although the water pipe is more harmful than cigarettes, 8.7% of the study participants were using water pipes and other forms of tobacco. Thus, for Saudi people, smoking shisha appears to be an increasing part of their social lives, even though such practices can impact on health status and increase the risk of cardiovascular disease.

Additionally, recent studies have reported that the use of water pipes has been increasing among youths in Saudi Arabia (Al-Damegh et al., 2004; Al-Yousaf & Karim, 2001; Amin, Amr, Zaza, & Suleman, 2010). Amin et al. (2010) conducted a study in the Al-Hassa region of Eastern Saudi Arabia to determine the prevalence of water pipe smoking among Saudi secondary school students of both genders aged 15 – 19 years as well as to assess their health-related knowledge and attitudes toward water pipes. Of the 1,651 participants in this study, the prevalence of current smokers was 30.3% among males and 8.5% among females. Water pipes were used by 53.9% of the current tobacco users and 20.7% of them were smoking water pipes on a daily basis. The smokers in this study stated that the primary motives for using water pipe smoking were outings with friends, boredom and wasting time. In addition participants' knowledge about the health hazards of water pipe smoking was low. More than half of the participants (52.1%) smoked a water pipe because it is more socially acceptable than cigarettes. Moreover, 33.8% of the participants found that the water pipe provided a good chance for gathering with friends and family. A total of 37.8% of the participants considered the water pipe helped them to relieve stress and tension (Amin et al., 2010). Findings from this study were consistent with the previous studies, which have suggested that smoking habits among adolescents increases with age. In addition, it has been argued that adolescents who start to smoke early are more likely to continue smoking as adults. Findings from previous studies indicated that there was a misconception regarding the dangerousness of water pipe smoking among water pipe users. Most of the participants in the previous studies reported that water pipe was neither as harmful nor as addictive as cigarettes. Some of the participants also reported that water pipes had lower nicotine content compared to that of cigarettes, and that water filtered out noxious chemicals, including carbon monoxide, nicotine, and tar. Moreover, some participants stated that a water pipe was a healthy choice because it contained fruit in the tobacco. Such findings indicate that improving knowledge and attitude toward smoking habits among adolescents in Saudi Arabia is required to facilitate change in behaviours.

Generally, studies in Saudi Arabia have demonstrated that smoking is a major health problem and there is a high prevalence of tobacco consumption among adolescents, the general public and even among health care workers. Interestingly, different studies have reported that smoking prevalence is quite high among health care workers even though they know the harmful effects of active and passive smoking (Al-Haqwi, Tamim, & Asery, 2010; Al-Turki et al., 2010; Behbehani, Hamadeh, & Macklai, 2004; Hashim, 2000; Taha et al., 2010). For example, although Al-Haqwi et al.'s (2010) study sample examined medical students and 94% of them have a good knowledge about the hazards of smoking, about a quarter (24%) of the sample were smokers.

2.4.2 Obesity

In recent years, lifestyles and social and behavioural patterns in Saudi Arabia have changed dramatically. The eating behaviour of children and adults in Saudi Arabia has changed towards greater consumption of unhealthy food (high sugar, high fat and Western fast food). This has led to an increased prevalence of obesity and diabetes. The modern diet of Saudi Arabians is now characterised by a high intake of carbohydrates, sugar and red meat. In the last 20 years, the daily consumption of fat intake in Saudi Arabia has increased by 143.3% (Shara, 2010).

Many studies have documented the prevalence of overweight and obesity among children and adolescents in different provinces of Saudi Arabia (Al-Dossary, Sarkis, Hassan, El Regal, & Fouda, 2010; Al-Hazzaa, 2007; Al-Rethaiaa, Fahmy, & Al-Shwaiyat, 2010; Al-Rukban, 2003; Al-Shammari, Khoja, & Gad, 2001; El-Hazmi & Warsy, 2002b; El Mouzan et al., 2010; Khalid, 2008; Mahfouz et al., 2008; Mahfouz et al., 2011) For example, in 2001–2002, it was estimated that the prevalence of overweight and obesity for the age group 12–20 years in Riyadh city was 13.8% and 20.5% respectively (Al-Rukban, 2003). Similarly, during late 2005, Mahfouz et al (2008) reported that the prevalence of overweight was 11% and obesity was 5% for school boys aged 11–19 years in Abha city, South-western Saudi Arabia. However, in 2008 a study was conducted in the same provinces of Saudi Arabia which reported a higher prevalence of overweight and obesity in the same age groups (Mahfouz et al., 2011). Results from this study indicated that the prevalence of overweight and obesity among boys was 23.2% (11.5% are considered overweight, 11.8% as obese) and among girls was 29.4% (15.5% are considered overweight, 13.9% as obese) (Mahfouz et al., 2011). Moreover, a household screening program was conducted in one study to determine the prevalence of overweight and obesity in Saudi children from different provinces of the country and targeted children from 1–18 years of age (El-Hazmi & Warsy, 2002a). Results from this study indicated that the prevalence of being overweight in boys and girls was 10.68% and 12.7%, respectively, where the prevalence of obesity was 5.98% and 6.74% in boys and girls, respectively (El-Hazmi & Warsy, 2002a). This study also revealed that the prevalence of overweight and obesity occurred in all provinces of Saudi Arabia. For example, boys in the Eastern province had the highest prevalence of overweight and obesity (27.4% & 10.4%) respectively, and the Southern province boys had the lowest prevalence of overweight and obesity although their rates were still high at 8.8% and 4.7% respectively. El-Hazmi and Warsy (2002a) suggested that differences in the prevalence of overweight and obesity across provinces could be explained by different eating habits, different types of food, and different degrees of physical activity. In respect to gender, this study found that girls have a higher prevalence of both overweight and obesity compared to boys. Further, with respect to age, the study reported that overweight and obesity tended to increase with age (El-Hazmi & Warsy, 2002a). In general, the results from previous studies suggest that obesity and overweight is a major public health problem among children and adolescents in Saudi Arabia and is a predictor of many diseases, including CVD.

Other studies have focused on the risk factors associated with overweight and obesity among children and adolescents in Saud Arabia (Al-Almaie, 2005; Al-Ghamdi, 2013; Al-Hazzaa, Musaiger, & Arab Teens Lifestyle Study Research Group, 2010; Amin, Al-Sultan, & Ali, 2008; Farghaly, Ghazali, Al-Wabel, Sadek, & Abbag, 2007). For example, a cross sectional study was conducted in Saudi Arabia to examine the prevalence of overweight and obesity and their relation to dietary habits and socio-demographic characteristics among male primary school children (Amin et al., 2008). The results of this study indicated that the prevalence of overweight was 14.2% and obesity was 9.7% among those10–14 years of age. The study also identified that the dietary habits for most overweight and obese children included low consumption of fruit, vegetables and milk; higher consumption of snacks, sweets and soft drinks; and not having or having an infrequent breakfast at home. Another important finding was that a high percentage of overweight and obese children were from an urban background. These children were older and their mothers were less educated (Amin et al., 2008). The study concluded that eating habits in addition to environmental differences represented the most dominant determinant of overweight and obesity among children in Saudi Arabia. In addition, less healthy dietary habits and poor food choices may be responsible for this high prevalence (Amin et al., 2008). This is consistent with Al-Hazzaa et al.'s (2010) study, which indicated that there is a significant association between obesity and less frequent consumption of breakfast, vegetables and fruit, but the study added that there is also an association between obesity and less frequent physical activity.

Another case-controlled study has been conducted to explore the association between watching television and obesity in children of school age (9–14 years) in Saudi Arabia (Al-Ghamdi, 2013). The results of this study showed that the prevalence of childhood obesity was associated with a higher number of televisions at home ($p < .001$), watching TV for more than three hours per day at the weekend ($p = .005$), watching TV at night ($p = .026$), and siblings' decision on how much TV to watch ($p = .025$). On the other hand, the study indicated that the prevalence of childhood obesity was significantly lower among those whose mother determined how much TV they could watch ($p = .03$).

In addition, a cross-sectional study was conducted to examine the nutritional knowledge among adolescents in eastern Saudi Arabia with a mean age of 16.3 years (Al-Almaie, 2005). Al-Almaie (2005) found that there was inadequate knowledge of healthy diets among school students. For example, 65.3% of females and 51.1% of males recognised unsaturated fats as a healthy food. In addition, about 66% of females and 49% of males could define cholesterol correctly as saturated fat or animal fat. Moreover, the study identified that dietary knowledge of both male and female students on the dangers of unhealthy foods and the benefits of a fibre-rich diet was unsatisfactory. For instance, just 3.9% of the boys and 2.1% of the girls studied had knowledge about the benefits of a fibre-rich diet. The main sources of knowledge about health and disease reported by the male and female respondents were television (58% and 61% respectively), magazines (31% and 39%), and the daily newspaper (33% and 34%). Primary health care centre staff were the least common source of knowledge (17% and 16%).

Different national surveys have been conducted to identify the prevalence and trend of overweight and obesity among adults in Saudi Arabia (Al-Othaimeen, Al-Nozha, & Osman, 2007; Alsaif et al., 2002; Ng, Zaghloul, Ali, Harrison, & Popkin, 2011; Osman & Al-Nozha, 2000). The evidence from these surveys stress that there is a high prevalence of overweight and obesity in all regions of Saudi Arabia and that obesity and overweight are enormous public health problems in Saudi Arabia. The middle-aged group are the group most at risk for obesity especially among Saudi women. Another study, the Saudi Project for Assessment of Coronary Events (SPACE) registry has been conducted to identify the prevalence of CVD risk factors among cardiac patients in Saudi Arabia (AlHabib et al., 2011). AlHabib and colleagues (2011) found that the BMI of acute coronary syndrome patients was 27.6 kg/m^2.

Additionally, a study conducted in 2002 sought to determine the prevalence and risk factors for obesity and overweight in the Saudi population using national survey data from 1990 to 1993 (Alsaif et al., 2002). This study found that in general, the majority of the Saudi population were either overweight (36.68%) or obese (39.65%). The prevalence of obesity was higher in women (49.15%) than in men (29.94%), and the prevalence of being overweight was higher in men (41.91%) than in women (31.55%). The highest prevalence of overweight and obesity was among the middle-aged group and there was a positive association between higher income and hypertension (Alsaif et al., 2002).

More recently, a systematic review was conducted of literature published between 1990 and 2009 to identify the prevalence and trends of overweight and obesity in six Arabian Gulf States (Bahrain, Kuwait, Qatar, Oman, Saudi Arabia and the United Arab Emirates) (Ng et al., 2011). The prevalence of overweight and obesity among adults (30–60 years old) was identified as being extremely high in the six Gulf States, particularly in Kuwait, Saudi Arabia and Qatar, and as being more common among women. The overall prevalence of overweight or obesity in Saudi Arabia was 66.2% for men and 71.4% for women (Ng et al., 2011). Similarly, this review found that there was high prevalence of obesity among children in Kuwait and Saudi Arabia. For instance, the prevalence of obesity among 0–5 year old Kuwaitis is 8.2% and among 1–6 year old Saudi preschoolers it is 9.9%. Among adolescents (10–19 years old), the prevalence of obesity in the six Gulf States was higher than that in developed countries, such as the USA, Australia, and the UK (Ng et al., 2011). In 2003, it was estimated that the prevalence of obesity among urban female students ranging from 6 to 17 years was 11.3% and the prevalence of being overweight was 20% (Al-Saeed, Al-Dawood, Bukhari, & Bahnassy, 2007). Interestingly, the obesity rate for the Saudi population has increased annually in both genders and among all age groups. For example, between 1992–2005, it was estimated that the obesity rate among middle-aged adults (30–60 years old) has been annually increasing by 1.5% for women and 4.1% for men. Additionally, between 1992-2000, it was estimated that the obesity rate among older adults (≥ 60 years old) has been increasing annually by 8.7% for women, and by 5.9% for men (Ng et al., 2011).

A cross-sectional study was conducted in Umm-AlQura University in Saudi Arabia. This study included 224 female students during 2009–2010 to determine the prevalence of obesity among female students and some related attributes (Abdelhafez & Al-Mashi, 2013). This study found that one quarter (25%) of the Saudi female students were overweight or obese. Abdelhafez and Al-Mashi (2013) identified that higher income level, family history of obesity, and eating while depressed or bored were the factors associated with overweight and obesity among the female students. In fact, this study confirmed that there was a significant relationship between high income and obesity. The same relationship was found between eating when upset, depressed or bored and overweight and obesity. Furthermore, it estimated that 60.7% of the overweight and obese students had a family history of obesity.

However, Abdelhafez and Al-Mashi's (2013) study found that there was no association between physical activity and overweight or obesity. This was inconsistent with Rasheed's (1998) case-control study in Saudi Arabia to examine the perception of body weight and eating and exercise behaviour among obese and non-obese Saudi women. Rasheed (1998) found that misconceptions about eating and exercise behaviour or weight control programs had a major effect on a person's weight status. The study identified that when women in Saudi Arabia experienced negative emotional feelings, they ate much more as a response to stress and anger which in turn effected their weight. Rasheed (1998) also reported that Saudi women are now more obese when compared to the average of European women, concluding that this may be related to the recent changes in socio-economic status, traditional food style, lack of physical activity, cultural barriers and greater engagement in lifestyle behaviours characterised as sedentary.

2.4.3 Physical Inactivity

Another aspect of the effect of changing lifestyle on the Saudi population is that there is a high prevalence of physical inactivity in Saudi Arabia (Al-Hazzaa, 2002, 2004a, 2004b; Al-Nuaim et al., 2012; Al-Refaee & Al-Hazzaa, 2001; Midhet, Al Mohaimeed, & Sharaf, 2010). Al-Hazzaa (2004a) reviewed the literature on physical inactivity in Saudi Arabia over the last 25 years. Al-Hazzaa (2004a) found that changing lifestyles in Saudi Arabia led to physical inactivity, which increased the risk of chronic heart disease. The review also indicated that the prevalence of physical inactivity among the Saudi population was extremely high and considered among the highest in the world. The prevalence ranged from 43.3% to 99.5% among Saudi children, youth and adults with time constraints and lack of facilities being the barriers to physical activity. Physical inactivity was considered by some to be a more important risk factor for CHD than other factors, with the percentage of Saudi adults at risk of CHD due to inactivity being 53.4% of men and 57.1% of Saudi boys (Al-Hazzaa, 2004b).

More recently, Shara (2010) reported similar findings for Saudi women, with rates of physical activity among Saudi women being lower than those for women in other countries. Shara (2010) concluded that this may be because many women have a role in the community which can create barriers for them. One study by Al-Nozha et al. (2007) reported that physical inactivity among Saudi women was as high as 98%.

A cross-sectional study conducted in Saudi Arabia to identify barriers to physical activity and healthy eating among patients who were attending a primary health-care clinic found that none of the participants met the level of physical activity recommended by the Centre for Disease Control (CDC) (AlQuaiz & Tayel, 2009). The study reported that the number of Saudi people classified as being physically inactive was 82.4%, with 87.6% of Saudi women identified as being physically inactive compared with 60% of all Americans who were physically inactive (AlQuaiz & Tayel, 2009). The study highlighted that a lack of resources, particularly among females, was the major reason for inactivity, followed by the lack of willpower and lack of energy (significantly in females). Al-Quaiz and Tayel (2009) concluded that developing a good physical environment and access to healthy food choices whilst improving understanding and awareness of the benefit of exercise and a healthy diet are important priorities for Saudi Arabia.

In conclusion, a review of the literature examining the CVD risk factors among the Saudi population has revealed that there is a significantly high prevalence of all major CVD risk factors among this population. There are several possible explanations for these results. Firstly, the rapid economic and social development in recent decades in Saudi Arabia associated with increasingly sedentary behaviours and the adoption of a Western lifestyle has been associated with an increase in the risk factors for many chronic diseases, including cardiovascular disease (Sharawi, 2009; Shara, 2010; Al-Refaee & Al-Hazzaa, 2001). Secondly, the lack of national primary prevention strategies to identify and treat high risk individuals could also account for the increase in the risk factors and subsequent rise in CVD events among the young population in this country. Thirdly, the high prevalence of overweight and obesity in Saudi Arabia is likely due to the increasing trend in this country to unhealthy and Western fast foods that are high in sugar and saturated fat (Shara, 2010). It may also be due to the low rates of physical activity reported in this population (Al-Hazzaa, 2004a). The high prevalence of smoking may be explained by the fact that the changing lifestyle in Saudi Arabia and adoption of the western lifestyle has led to Saudis adopting many ways that were not usually practiced in this country (Sharawi, 2009). In addition, there is an absence of regulatory frameworks, public policy and laws to protect the health of the Saudi community (Al-Nozha et al., 2009). For example, there is no policy to restrict smoking behaviour in public places and workplaces, no signs for warning about the dangers of smoking, and no penalties for smoking in public. Many countries which have developed policies for health issues, such as smoking, have reported success in reducing overall death and disability (Sallis, Owen, & Fisher, 2008). There is also the lack of public awareness about health issues and the misconception regarding smoking as a prestigious habit and that it is only wealthy people who smoke. Such findings suggest that a multidisciplinary approach to problem-solving and behavioural change should be considered in designing secondary prevention programs in this country.

2.5 SECONDARY CVD PREVENTION

There is good evidence that CVD risk factors can be modified through structured secondary prevention programs (Khatib, 2004; Lloyd-Jones et al., 2009; WHO, 2013a). These programs are provided for cardiac patients through services such as cardiac rehabilitation centres, which aim to prevent complications or recurrent cardiovascular events. The main aims of secondary prevention programs are to restore a cardiac patient's quality of life, improve their functional capacity, provide counselling support, teach self-management techniques and promote the adoption of a healthy lifestyle.

There are a number of systematic reviews describing the effectiveness of both pharmacological and non-pharmacological interventions for secondary prevention in patients with an existing CVD (Al-Mallah et al., 2006; Davis et al., 2006; Ellis et al., 2003; Hassan & Amonkar, 2001; MacKay-Lyons et al., 2010; National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand, 2008; Wenger, 2008; WHO, 2007; Yzebe & Lievre, 2004). In this section, pharmacological interventions are considered first, followed by non-pharmacological interventions.

2.5.1 Pharmacological Interventions

High level evidence from systematic reviews of the pharmacological interventions supports the use of aspirin and angiotensin converting enzyme inhibitors (ACEI) for all patients post-cardiac event unless there are contraindications. Use of beta-blockers, lipid lowering drugs, and anti-hypertensive drugs are also recommended to reduce the incidence of a second heart attack (Al-Mallah et al., 2006; Aronow et al., 2001; Ellis et al., 2003; Foody et al., 2006; Hassan & Amonkar, 2001; Schwartz et al., 2001; Walsh & Pignone, 2004; Yzebe & Lievre, 2004) (Table 2.1)

Table 2.1

Summary of the Pharmacological Management; Adopted from: Reducing Risk in Heart Disease 2007:Guidelines for Preventing Cardiovascular Events in People with Coronary Heart Disease: Updated 2008. *© 2007–2008 National Heart Foundation of Australia. Adopted with Permission*

Pharmacological Management

Medication	**Recommendation**
Antiplatelet agents	All patients should be taking aspirin 75–150 mg/day unless contraindicated. Clopidogrel is an alternative when aspirin is contraindicated and should be considered in combination with aspirin in patients who have recurrent cardiac ischaemic events. Clopidogrel is recommended in combination with aspirin in the acute management of ST-elevation myocardial infarction (STEMI) and high-risk non-ST elevation ACS. There is evidence that clopidogrel, 75 mg/day, should be continued for at least 1 month after fibrinolytic therapy and for up to 12 months after stent implantation, depending on the particular type of stent and circumstances of implantation. Clopidogrel use carries an increased risk of bleeding during surgery.
ACE inhibitors (ACEI)/Angiotensin II receptor antagonists (ARA)	Consider ACEIs in all patients, especially in those at high risk, unless contraindicated. Start early post-MI. Consider ARAs for patients who develop unacceptable side effects on ACEIs.
Beta-blockers	Start in all post-MI patients unless contraindicated and continue indefinitely, especially in high risk patients.* *High risk patients are defined as those with either: - significant myocardial necrosis - Left ventricular systolic dysfunction - Persistent evidence of ischaemia - Ventricular arrhythmia
Statins	Statin therapy is recommended for all patients with CHD (apart from in exceptional circumstances), and in hospitalised patients should be commenced during that admission.
Anticoagulants	Warfarin is recommended in survivors of MI at high risk of systemic thromboembolism because of atrial fibrillation, mural thrombus, or previous embolisation. It may sometimes be combined with aspirin but in this circumstance patients should be observed closely for signs of bleeding.
Aldosterone antagonists	Eplerenone may be prescribed early (3–14 days) post-MI in those with left ventricular systolic dysfunction and symptoms of heart failure.

Other Medication

Medication	Recommendation
Antiarrhythmics	Due to the potential fatal pro-arrhythmic effects of antiarrhythmic agents, the routine usage of these drugs following ACS is not recommended, especially in patients with depressed left ventricular function. Carefully balance benefits and risks. Avoid use to suppress ventricular ectopic activity. Patients with documented sustained ventricular tachycardia should usually be referred for specialist opinion. Amiodarone is often chosen to teat symptomatic ventricular tachycardia, and may reduce the incidence of arrhythmic death in patients post-MI, but has no effect on total mortality.
Calcium channel blockers	Calcium channel blockers of the non-dihydropyridine group (diltiazem, verapamil) may be used as antianginal agents for patients in whom beta-blocker therapy is contraindicated, provided there is no evidence of chronic heart failure. In addition, controlled-release verapamil has been shown to reduce the incidence of cardiovascular events in patients with stable angina; it may decrease the risk of reinfarction and death after MI.
Influenza and pneumococcal vaccinations	All patients should receive pneumococcal and annual influenza vaccinations (unless contraindicated).
Oestrogens & progestins (or oestrogen alone in women who have had a hysterectomy)	Should not be prescribed for primary or secondary prevention of CHD. If hormone replacement therapy is prescribed for other conditions, risks and benefits must be considered.
Antioxidants (Vitamin A, Vitamin C, beta-carotene, Vitamin E)	There are no large-scale trial data to recommend antioxidant supplements for the prevention or treatment of CHD.

There are many benefits of pharmacotherapy in controlling cardiovascular risk factors and reducing the morbidity and mortality in patients with an existing cardiac event. In a comprehensive review, Wenger (2008) presented evidence confirming the benefits of using pharmacological therapy in reducing the morbidity and mortality of cardiac patients by controlling risk factors and preventing recurrent cardiac events. Wenger's review considered drugs, including omega-3 fatty acids, ACE inhibitors, and angiotensin II receptor antagonists or blockers, aspirin, β-adrenoceptor antagonists (β-Blockers) and their role in preventing recurrent cardiac events.

The effectiveness of the 4 evidence-based medications with aspirin, beta-blockers, ACE inhibitors, and statins in secondary prevention to reduce the recurrent MI and death in patients with existing MI has also been reported (McCormick et al., 1999; Pfeffer et al., 1992). It has been estimated that these medications can reduce the incidence of recurrent cardiac events and death respectively by (31%) and (13%) for aspirin, (27%) and (22%) for beta-blockers, (25%) and (21%) for ACE inhibitors, and (25%) and (14%) for all lipid-lowering medications (McCormick et al., 1999; Pfeffer et al., 1992). The results of these studies indicate that using statins alone can reduce the incidence of recurrent MI in patients who have had an established MI by 24% (McCormick et al., 1999; Pfeffer et al., 1992).

Further evidence of the benefits of omega-3 fatty acids and aspirin has also been reported (Yzebe & Lievre, 2004). One systematic review of 10 trials performed by Yzebe and Lievre (2004) examining the efficacy of omega-3 fatty acids in reducing the mortality and morbidity of CVD supported the benefits of this therapy in reducing the incidence of recurrent CVD. A total of 14,727 adults who had a cardiac event were enrolled in these studies and given daily omega-3 fatty acids for 37 months (Yzebe & Lievre, 2004). The review concluded that the benefit of using omega-3-fatty acids daily was a decrease in mortality rate by 16%, and a reduction of 24% in the rate of MI deaths. In addition, the benefit of aspirin in secondary prevention is well documented (Hassan & Amonkar, 2001). Hassan and Amonkar (2001) investigated the prevalence of using aspirin for the primary and secondary prevention of CVD. They demonstrated that the rate of using aspirin in secondary prevention of cardiovascular disease is much higher at 72.4% than that used in primary prevention, that is 19.8%. Hassan and Amonkar (2001) suggested that the higher rate of aspirin use in secondary prevention was due to strong evidence of the benefits of aspirin in reducing the recurrence of cardiovascular events.

Another systematic review and meta-analysis was conducted to evaluate the beneficial effects of ACEI use in patients with coronary artery disease and preserved left ventricular systolic function (Al-Mallah et al., 2006). Seven trials which included 33,500 patients were included in this review. A total of 16,772 patients were randomised to receive ACEI and 16,728 patients randomised to placebo for 4.4 years (Al-Mallah et al., 2006). This meta-analysis revealed a modest favourable effect of ACEIs on patients with coronary artery disease and preserved left ventricular function (Al-Mallah et al., 2006). Using ACEIs showed a decrease in cardiovascular mortality, non-fatal MI, all-cause mortality and revascularisation rates.

Strong evidence from systematic reviews of RCTs also confirms that beta-blockers reduce the incidence of recurrent cardiac events. Ellis et al. (2003) studied the effect of beta-blocker therapy in 2,894 patients with unstable angina or an acute myocardial infarction undergoing percutaneous coronary intervention. This cohort study included five randomised, controlled trials of abciximab during a coronary intervention that involved 1,939 patients receiving beta-blockers and 955 who were not treated with beta-blocker therapy. The patients were followed-up for 30 days and then 6 months. For both follow-up periods, there was a significantly lower mortality rate in patients receiving beta-blockers than those who did not receive beta-blockers (Ellis et al., 2003). At 30 days, the mortality rate was 2.0% in the non-beta-blocker group and 0.6% in the patients who received beta-blocker therapy. At 6 months, the mortality rate was 3.7% in the non-beta blocker group and 1.7% in the group who received beta-blockers (Ellis et al., 2003). Thus, there is agreement in the literature that pharmacological interventions reduce the risk of recurrent CVD.

2.5.2 . Non-pharmacological Interventions

Numerous systematic reviews have addressed the effectiveness of non-pharmacological strategies for secondary prevention of cardiovascular events, including modifying lifestyles related to risk behaviours (Brunner et al., 2007; Clark et al., 2005; Davies et al., 2010; Hackam & Spence, 2007; Jolliffe et al., 2001; Lennon et al., 2008; MacKay-Lyons et al., 2010; Mead et al., 2006; Taylor et al., 2004). These reviews examined whether lifestyle measures such as stopping smoking, engaging in physical exercise and consuming a healthy diet could reduce cardiovascular mortality in people who had existing cardiac disease (Brunner et al., 2007; Clark et al., 2005; Davies et al., 2010; Hackam & Spence, 2007; Jolliffe et al., 2001; Lennon et al., 2008; MacKay-Lyons et al., 2010; Mead et al., 2006; Taylor et al., 2004).

Regarding diet, Mead et al. (2006) updated dietetic guidelines for secondary prevention programs for patients who had existing cardiac events. This guideline was based on a systematic review of diet that was recommended for post-cardiac event patients to prevent further cardiac events (Mead et al., 2006). The dietetic guidelines report evidence that indicates that a reduction of saturated fat reduced morbidity in patients with CVD. In addition, patients who had experienced MI were recommended to seek advice on the Mediterranean diet and to increase their intake of omega-3 fatty acids (Mead et al., 2006).

A meta-analysis of 63 randomised trials involving 21,295 participants was conducted to determine the effectiveness of the variety of secondary prevention programs with or without exercise components for patients with coronary artery disease (Clark et al., 2005). The systematic review found that there was a 17% reduction of recurrent myocardial infarction at 12 months and a 47% reduction of mortality at 2 years with secondary prevention programs. This review concluded that although improvement of the participants' health status appeared with longer follow-up, a positive effect of the secondary prevention program on the process of care (risk factors and quality of life) was confirmed (Clark et al., 2005). This review also showed that the benefits of secondary prevention programs were no different with the mixing of a different range of programs (Clark et al., 2005).

De Waure et al. (2013) expanded the systematic review to determine the effectiveness of non-pharmacological intervention with multiple lifestyle components on reducing fatal and non-fatal cardiovascular events in patients with existing coronary heart disease. The interventions in this review were a combination of at least two of the following interventions: diet recommendation, exercise-training sessions, anti-smoking sessions, psychological intervention programs, and behavioural intervention. The systematic review demonstrated that multifactorial lifestyle interventions bring about a significant reduction in fatal cardiovascular events (both symptomatic and asymptomatic) in patients with existing CHD (de Waure et al., 2013). This review also found that the effectiveness of these interventions in patients with CHD showed a positive effect, although not always significant, on the reduction of total cardiovascular events, nonfatal cardiovascular events, hospital readmissions, and deaths (de Waure et al., 2013). Critchley and Capewell's (2003) systematic review showed that although recent articles concentrated on cholesterol lowering therapies, quitting smoking demonstrated a more significant reduction in mortality compared to other secondary prevention methods.

A systematic review and meta-analysis of randomised controlled trials addressing the efficacy of flu vaccination in secondary prevention programs in patients with existing acute coronary diseases or planning for percutaneous cardiac interventions, included 301 patients and involved 151 patients randomised to vaccine therapy compared with 150 patients randomised to control. These patients were followed-up for a one year period (Gurfinkel, Leon de la Fuente, Mendiz, & Mautner, 2004). This study showed that there was an association with receiving a flu vaccine and significant reduction in the incidence of cardiovascular death (fatal MI, sudden death) (6%) compared with the control group (17%). In addition, the incidence of the composite triple end-point (death, acute MI and re-hospitalisationrequired for coronary artery bypass surgery or angioplasty) was significantly reduced in the group who received the flu vaccination compared with the placebo group (22% vs. 37%). The authors concluded that there was a reduction in the incidence of death and ischaemic events for patients who have myocardial infarction or post angioplasty and received the flu vaccination during flu season.

2.5.3 Cardiac Rehabilitation Services

Reviews have also focussed on cardiac rehabilitation services and the achievement of secondary prevention goals (Clark et al., 2005; Thomas et al., 2007). These reviews considered cardiac rehabilitation as a tool for secondary prevention of cardiovascular disease. The US Public Health Service and The Cardiac

Rehabilitation, and Secondary Prevention Performance Measures Writing Committee defined these programs as:

> "Cardiac rehabilitation services are comprehensive, long-term programs involving medical evaluation, prescribed exercise, cardiac risk factor modification, education, and counselling. These programs are designed to limit the physiological and psychological effects of cardiac illness, reduce the risk for sudden death or re-infarction, control cardiac system, stabilize or reverse the atherosclerotic process, and enhance the psychosocial and vocational status of selected patients" (Thomas et al., 2007, p. 264).

There are three main objectives of cardiac rehabilitation programs (Mampuya, 2012; Thomas et al., 2007). Firstly, cardiac rehabilitation programs help cardiac patients regain their confidence and improve their physical activities. Secondly, these programs assist patients to manage and control the modifiable risk factors. Lastly, these programs help patients to manage the psychosocial and professional problems that occur after a cardiac event. The eligibility criteria for cardiac rehabilitation programs was determined as acute myocardial infarction, stable angina pectoris, coronary artery bypass graft surgery, heart valve repair or replacement, percutaneous tansluminal coronary angioplasty and heart transplantation or heart-lung transplantation (Mampuya, 2012; Thomas et al., 2007). Contraindications of cardiac rehabilitation were identified as unstable angina, decompensated heart failure, complex ventricular arrhythmias, pulmonary arterial hypertension, intracavitary thrombus, recent thrombophlebitis with or without pulmonary embolism, severe obstructive cardiomyopathies, severe or symptomatic aortic stenosis, uncontrolled inflammatory or infectious pathologies and any musculoskeletal condition that prohibits physical exercise (Mampuya, 2012; Thomas et al., 2007).

The cardiac rehabilitation program is divided into three phases. Phase I or inpatient phase is initiated while the patient is still in the hospital. Phase II is an early outpatient program that involves preventive and rehabilitative services provided for the patient soon after a CVD event. This program commences within the first 3 to 6 months after the event for 3 to 4 weeks duration. Phase III is a long-term outpatient program (Mampuya, 2012; National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association, 2004). This program provides preventive and rehabilitative services for lifetime maintenance.

Cardiac rehabilitation has been shown to improve quality of life, physical health and subsequent morbidity and mortality (Griffo et al., 2013; Hsu et al., 2011; Jolliffe et al., 2001; Stauber et al., 2013; Taylor et al., 2004; Williams et al., 2006; Yu & Müller-Riemenschneider, 2011). Two meta-analyses of clinical trials identified that participation in cardiac rehabilitation after myocardial infarction was associated with a significant reduction in total mortality by 24% and 20%, respectively and cardiac mortality at three-year follow-up by 25% and 22%, respectively (O'Connor et al., 1989; Oldridge, Guyatt, Fischer, & Rimm, 1988). Jolliffe and colleagues (2001) conducted a systematic review which included more women and older patients with different cardiac events, including MI, post-coronary artery bypass graft (CABG) and percutaneous cardiac interventions (PCI). This review found that cardiac rehabilitation exercise programs reduce all causes of mortality by 27% and cardiac mortality by 31% (Jolliffe et al., 2001). More recently, a meta-analysis of 34 randomised control trails involving 6,111 patients was conducted to determine the efficacy of exercise-based cardiac rehabilitation post-myocardial infarction (Lawler, Filion, & Eisenberg, 2011). This review found that the exercise-based cardiac rehabilitation had a significant reduction in both fatal and nonfatal events (odds ratio

[*OR*] 0.53, 95% CI 0.38–0.76), cardiac mortality (*OR* 0.64, 95% CI 0.46–0.88), and all cause mortality (*OR* 0.74, 95% CI 0.58–0.95). This was the first meta-analysis to show a significant reduction in fatal and nonfatal events with exercise-based cardiac rehabilitation post-myocardial infarction (Lawler et al., 2011). Findings from these reviews therefore provide evidence that support the benefit of cardiac rehabilitation programs in reducing the morbidity and mortality for different cardiac events.

Recent evidence from meta-analyses also confirm the association between participation in cardiac rehabilitation programs and the reduction of the mortality and morbidity in the long-term (Hammill, Curtis, Schulman, & Whellan, 2010; Taylor et al., 2004). This review included more than 600,000 patients who were hospitalised with acute coronary syndrome, percutaneous coronary intervention, or coronary artery bypass graft surgery (Hammill et al., 2010). Of these patients, 73,049 (12%) participated in cardiac rehabilitation programs. After 1 year, it was noted that the mortality rate among cardiac patients who participated in cardiac rehabilitation was 2.2% versus 5.3% for nonparticipants (Hammill et al., 2010). The result of this study identified that the benefit of participation in cardiac rehabilitation was sustained over the long-term. At 5 years, the mortality rate of patients who participated in cardiac rehabilitation was 16.3% versus 24.6% for nonparticipants. The study also noted that there is a relationship between the frequency of exercise sessions and the benefit of the cardiac rehabilitation (Hammill et al., 2010). This study found that patients who attended 25 or more sessions had a 20% lower 5-year mortality rate than those who attended less than 25 sessions (Hammill et al., 2010). Another meta-analysis of exercise-based cardiac rehabilitation versus usual care after coronary heart disease documented a reduction in total and cardiovascular mortality in medium and long term studies (12 or more months follow-up) (Heran et al., 2011). The reviews also documented a reduction of hospital admission in short term studies (< 12 months follow-up). However, there was no reduction in total myocardial infarction or revascularisation, including coronary artery bypass graft (CABG) or percutaneous transluminal coronary angioplasty (PTCA) (Heran et al., 2011). Thus, such evidence suggests it may be necessary to recommend participation in cardiac rehabilitation programs following cardiac events to reduce the morbidity and mortality of this disease.

Evidence also indicates that cardiac rehabilitation programs improve health-related quality of life of cardiac patients after cardiac events (Höfer et al., 2009; Weberg, Hjermstad, Hilmarsen, & Oldervoll, 2013; Yohannes, Doherty, Bundy, & Yalfani, 2010). In two studies conducted to assess the health-related quality of life among cardiac patients who participated in an inpatient rehabilitation program (Höfer et al., 2009; Weberg et al., 2013), the MacNew Heart Disease Health-related Quality of Life was one of the measurement tools used in both. Höfer et al.'s (2009) study collected data at three points: at the beginning (pre-rehabilitation, T0), the end of the 4-week (post-rehabilitation, T1), and two year follow-up (T2). Weberg et al.'s (2013) study collected data at the beginning (pre-rehabilitation, T0), the end of week 4 (post-rehabilitation, T1), and 5 months post-discharge (T2). The two studies documented a significant improvement in all MacNew HRQL scores between two periods, from admission (T0) to discharge (T1). However, although HRQL scores significantly decreased over the long-term follow-up (T2), the HRQL scores are still significantly higher than at T0 (Höfer et al., 2009; Weberg et al., 2013).

It has been argued that the effectiveness of home-based cardiac rehabilitation (outpatient) is equal to the centre-based cardiac rehabilitation (inpatient) in improving the clinical and health-related quality of life outcomes (Shepherd &

While, 2012; Taylor, Dalal, Jolly, Moxham, & Zawada, 2010). The systematic reviews of Taylor et al. (2010) and Shepherd & While (2012) conclude that home-based cardiac rehabilitation reduced mortality and morbidity, improved quality of life and modified risk factors among cardiac patients. The reviews suggested that home-based cardiac rehabilitation may provide an opportunity for women and older patients who are less likely to participate in cardiac rehabilitation to improve their uptake and adherence of cardiac rehabilitation programs.

Cardiac rehabilitation programs were initially described in the 1950s in the USA, and originally included exercise intervention only (Ades, 2001; Mampuya, 2012). After this, such programs developed to include comprehensive programs for client assessment, teaching about modifiable risk factors, counselling support, improving quality of life, and managing factors that may have affected patient outcomes, including nutrition, psychology, behavioural and social factors (Ades, 2001; Mampuya, 2012). Secondary prevention practices, including cardiac rehabilitation programs have been typically based on evidence-based practical guidelines to guide health professionals and policy makers in providing effective services which are updated regularly.

In 1994, the American Heart Association (AHA)/American College of Cardiology (ACC) created the first guidelines based on evidence from systematic reviews for managing patients with heart attack (Balady et al., 2007; Braunwald et al., 2002; Leon et al., 2005; Mosca et al., 2007; Smith et al., 2006; Smith et al., 2004; Smith et al., 2011). In 2005, the AHA/ACC updated and reviewed the recommended components of effective cardiac rehabilitation programs. A rationale for each component of the secondary prevention programs was added and a greater emphasis was included on exercise as an important component to improve the cardiac patient's physical fitness (Leon et al., 2005). The following year, the AHA/ACC updated the recommendations for secondary prevention based on practice guidelines from the National Institutes of Health and ACC/AHA (Smith et al., 2006). These practices were based on evidence that managing risk factors could reduce the recurrent incidence of heart attack, improve quality of life and reduce the incidence of needing other interventions.

In 2007, the AHA and the American Association of Cardiovascular and Pulmonary Rehabilitation stated that all cardiac rehabilitation programs should consist of specific core components which aim to promote a good lifestyle for cardiovascular patients, support healthy behaviours and achieve risk reduction (Balady et al., 2007). As a result, the updates added evaluation, intervention, and outcomes for each of the core components, achieving goals through patient assessment, managing risk factors, providing counselling for nutrition, promoting physical activities, and initiating psychosocial intervention. The main result of this update was to concentrate more on improving lipid levels and ensuring that patients adhered to suitable medications.

More recently, in 2011, the AHA and the American Association of Cardiovascular and Pulmonary Rehabilitation updated the guideline for secondary prevention for cardiac patients (Smith et al., 2011). The title of this guideline was expanded to "Secondary Prevention and Risk Reduction Therapy for Patients with Coronary and Other Atherosclerotic Vascular Disease". Recent evidence in this guideline confirmed that the comprehensive risk factors management improved survival, reduced recurrent events, and improved quality of life for patients with existing CVD. The new guideline highlighted the importance of health care professionals' roles in supporting the implementation of the recommended guidelines to maximise the benefits for patients. This guideline has confirmed all the therapy recommendations of the previous guideline with an increased emphasis on the importance of reducing the risk factors and the role of the health care professional in doing so. One of the most significant results of this update was to add a new section on depression and cardiac rehabilitation. The guideline argued that patients suffering a recent cardiac event should be screened for depression. Additionally, it is suggested that all eligible patients should be referred to outpatient cardiac rehabilitation programs prior to their discharge or in the first follow-up visit.

Prevention of cardiovascular disease in women has also been a focus of research in a number of western countries (Australian Institute of Health and Welfare (AIHW), 2010; Mosca et al., 2007; Mosca et al., 2011). In 2011, the AHA with other organisations updated their effectiveness-based guidelines for the prevention of cardiovascular disease in women (Mosca et al., 2011). In these guidelines, there has been a change in the focus from “evidence-based” to “effectiveness-based” which focuses more on the implementation of evidence into the real world. In addition, these guidelines have focused on health education for patients and their families, including medication or lifestyle intervention, and also assessing barriers for intervention, especially for women, such as stress, fatigue, family responsibilities, and lack of time (Mosca et al., 2011).

Although these guidelines were supported with evidence (Balady et al., 2007; Braunwald et al., 2002; Leon et al., 2005; Mosca et al., 2007; Smith et al., 2006; Smith et al., 2004), there is a significant gap between what is expected from published authorities and the reality of clinical practice (EUROASPIRE Study Group, 1997; EUROASPIRE II, 2001; Kotseva et al., 2009; Ma, Monti, & Stafford, 2005; Mendis, Abegunde, Yusuf, Ebrahim, & et al., 2005; Qureshi, Suri, Guterman,

& Hopkins, 2001; Wood, 2001). For example, in 2005, the AHA reported that of the more than 2 million patients yearly who are eligible for cardiac rehabilitation programs, only 10% to 20% participated in these programs (Leon et al., 2005). Additionally, the EUROASPIRE (European Action on Secondary and Primary Prevention by Intervention to Reduce Events) surveys were conducted in European countries by the European Society of Cardiology (ESC) to evaluate the implementation of secondary prevention guidelines in daily clinical practice for coronary heart disease (EUROASPIRE Study Group, 1997; EUROASPIRE II, 2001; Kotseva et al., 2009; Wood et al., 2001). The first survey (EUROASPIRE I) was performed in 1995-1996 and included nine European countries and the second survey (EUROASPIRE II) was undertaken in 1999–2000 in 15 countries. The most recent survey (EUROASPIRE III) was expanded to 22 countries and was conducted over 2006–2007 (Kotseva et al., 2009). The three surveys identified a significant gap in implementing cardiovascular disease prevention into daily clinical practice in participating countries (Kotseva et al., 2009). In EUROASPIRE III, the number of young female patients who smoked had increased to higher levels than in the first and second surveys. Moreover, four out of five patients in EUROASPIRE III were overweight (BMI $\geq$ of 25 kg/m^2), and over a third were obese (BMI $\geq$ 30kg/m^2) (Kotseva et al., 2009). The EUROASPIRE project highlights gaps in integrating cardiovascular disease prevention in European countries. This gap could relate to a variety of factors, including a lack of awareness, attitudes, and a lack of perceived benefit (Leon et al., 2005).

Similarly, a WHO-PREMISE cross-sectional study of three low-income and seven middle-income countries was conducted by a WHO group to assess current practices relating to secondary prevention and identify barriers to secondary prevention (Mendise et al., 2005). This study found that there was an underuse of medications among the participants for different reasons, such as healthcare professionals not applying evidence-based practice to their daily clinical practice, patients being unable to afford to pay for the medication/s or, the medication/s being unavailable (Mendise et al., 2005). The results of this study as related to the prescription of medications were worse than the EUROASPIRE projects. For example, while only 50% and 36% of coronary patients in the EUROASPIRE project were prescribed of ACEI and statins respectively, only 48%, 39.8% and 20.8% of patients in the WHO-PREMISE study received prescription for beta-blockers, ACE inhibitors, and statins respectively. In addition, cardiac patients in the WHO-PREMISE study reported different barriers to adequate physical activity. These barriers were lack of time, lack of facilities and misunderstandings about physical activity, with some patients believing that physical activity had a negative impact on health (Mendise et al., 2005).

More recently, a Tunisian cross-sectional study has been modelled after the WHO-PREMISE study and conducted to evaluate the secondary prevention practices of coronary heart disease in Tunisia using the PREMISE (Ben Mansour et al., 2012). This study reported that the proportion of patients with hypertension, diabetes, hypercholesterolemia, and current smoking had reduced compared with the data in the WHO-PREMISE study (Ben Mansour et al., 2012; Mendise et al., 2005). This study also reported a significant increase in the prescription of evidence-based medications to the Tunisian patients. However, there was no change with the adherence to these medications. Importantly, this study revealed that non-pharmacological prescriptions, including healthy diet, and tobacco cessation had been reduced (Ben Mansour et al., 2012). Therefore, it is clear that there is still a significant gap in secondary prevention in Tunisia.

2.6 SECONDARY CVD PREVENTION IN SAUDI ARABIA

2.6.1 Pharmacological Interventions

There are a limited number of reviews that examine pharmacological interventions used in Saudi Arabia as secondary prevention. Khalil and Abba (2003) conducted a study in Saudi Arabia to evaluate current practice for patients admitted to hospital with acute myocardial infarction. The study involved 315 patients who were admitted to a Chronic Care Unit with acute MI. A total of 80.9% of patients received thrombolytic therapy during hospitalisation, and 19.1% did not receive it for a variety of reasons. A total of 76.1% of patients were discharged on beta-blockers, 61.5% with ACE inhibitors, 83.9% with nitrates and 4.5% with hypolipidemia agents, while aspirin was given to all patients. Khalil and Abba (2003) identified a number of significant factors that prolonged survival, reduced hospitalisation, reduced incidence of re-admittance to hospital, and reduced incidence of recurrent MI. The study identified that applying a different modality such as the ACC/AHA guidelines for managing patients with acute MI was effective for improving patient outcomes in Saudi Arabia (Khalil & Abba, 2003). However, this study was confined to acute MI patients only. More research is needed to evaluate practices with regard to pharmacological intervention after any cardiac event to determine the extent to which it complies with national guidelines for secondary prevention.

2.6.2 Non-pharmacological Interventions

There are few research studies in Saudi Arabia examining non-pharmacological interventions for CVD patients. Although Hassan and Fawzy (2004) note that exercise training improves general health and quality of life among older women who had coronary artery disease, they did not report on the percentage of improvement for Saudi women patients. Rather, these researchers provided evidence which relied on worldwide studies as opposed to data specifically related to the Saudi context (Hassan & Fawzy, 2004). This may not be applicable to Saudi Arabian women. Another Saudi study examined the relationship between tea consumption and the prevalence of CHD (Hakim et al., 2003). The data from this study were collected from 1993 to 1998 to examine the hypothesis that regular tea consumption could reduce the risk of CHD. Of 3,430 who were interviewed, 216 were CHD cases with 3,205 in the control group. Hakim et al. (2003) identified that only 6.3% of those with CHD who drank more than 6 cups of tea daily still had signs of CHD, and others CHD patients were improved with regard to the various risk factors. Findings from this study indicated that 50% of the risk for CHD was reduced for people who drank more than 6 cups of tea daily (Hakim et al., 2003). Although there is substantial evidence supporting the effectiveness of secondary prevention delivered through cardiac rehabilitation centres, there is limited information about secondary prevention strategies for CVD patients in Saudi Arabia

2.7 HEALTH-RELATED QUALITY OF LIFE (HRQL) OF CVD PATIENTS

There is evidence from previous studies suggesting that patients' quality of life is affected after a cardiac event (Hodges, Kirby, Solanki, O'Donnell, & Brodie, 2007; I. Johansson, Karlson, Grankvist, & Brink, 2010; P. Johansson et al., 2010; Keyes, 2004; Lane, Carroll, Ring, Beevers, & Lip, 2001; Li et al., 2008; Strik, Denollet, Lousberg, & Honig, 2003; White & Groh, 2007; Whooley, 2006). Evaluation of quality of life after a cardiac event has received attention from a number of researchers (Hodges et al., 2007; I. Johansson et al., 2010; Keyes, 2004; Lane et al., 2001; Li et al., 2008; Strik et al., 2003; White & Groh, 2007; Whooley, 2006). Some of the research has focused on the effects of cardiovascular disease on the patient's quality of life in the area of emotional factors, including depression and anxiety (Ågren, Evangelista, Davidson, & Strömberg, 2011; Keyes, 2004; Lane et al., 2001; Strik et al., 2003; White & Groh, 2007; Whooley, 2006). In fact, numerous studies, systematic reviews and meta-analyses have focused on depression and the effect on patients with existing CVD (Lichtman et al., 2014; Goldston & Baillie, 2008; Whooley et al., 2008; Dickens et al., 2012). Results from these previous reviews reported that the rate of prevalence of depression in patients with existing CVD are 20% or higher (Lichtman et al., 2014; Goldston & Baillie, 2008; Whooley et al., 2008; Dickens et al., 2012). The reviews also revealed that there was a significant association between depression and increased morbidity and mortality in cardiac patients. Additionally, depression in cardiac patients also was associated with a significant impairment of health-related quality of life (Dickens et al., 2012). For example, Strik et al. (2003) reported that among patients who were assessed for emotional distress one month post-MI, both depression and anxiety were significantly associated with the cardiac event. Moreover, symptoms of anxiety were identified to be a significant predictor of cardiac death or recurrent MI more than depression (Strik et al., 2003). In particular, White and Groh (2007) studied the impact of a cardiac event on depression and quality of life in women. In this study the Beck Depression Inventory and Short-Form-36 instruments were used with 27 women who had experienced an MI in the previous 11 months. Almost half of the women had some degree of depression, with 41% reporting mild to moderate depression and 7% having severe depression (White & Groh, 2007). Although there was no significant relationship between depression and physical health in the sample, there was a negative correlation between depression and mental health in this study (White & Groh, 2007).

Recent systematic reviews have explored the relationship between depression and increased CVD events due to behavioural and lifestyle factors (Whooley et al., 2008;Goldston & Baillie, 2008). Evidence suggests that a cardiac patient who was depressed was less likely to adopt a healthy lifestyle to reduce the risk of recurrent cardiac events, including quitting smoking, following healthy diet or undertaking physical activity (Whooley et al., 2008;Goldston & Baillie, 2008). Cardiac patients who were depressed were also found to be more likely to be non-adherent with medications (Goldston & Baillie, 2008). The reviews concluded that the relationship between depression and CVD events might be modifiable with behavioural interventions (Goldston & Baillie, 2008). Recently a systematic review and meta-analysis was conducted by the American Heart Association's committee to identify the role of depression as a risk factor for adverse medical outcomes (Lichtman et al., 2014). This review included 53 studies and 4 meta-analyses. The systematic review provided evidence that supported the recommendation of elevated depression to be a risk factor for adverse medical outcomes in patients with ACS (Lichtman et al., 2014).

Sexual dysfunction and the effect of CVD on patients and their partners' relationship was also highlighted in a range of studies (Chen, Zhang, & Tan, 2009; Drory, Kravetz, & Weingarten, 2000; Hodges et al., 2007; Kaya, Yilmaz, Nurkalem, Ilktac, & Karaman, 2007; Steinke, 2010). Hodges et al. (2007) noted that 66% of men who had had a cardiac event suffered from erectile dysfunction in different stages of severity which might affect their health-related quality of life and their partner. Kaya et al. (2007) also investigated sexual function in women who had experienced coronary artery disease. Twenty female patients with CAD and 15 healthy females of similar age, education and BMI were participants in this study. This study identified that 60% of female patients were diagnosed with female sexual dysfunction compared to 33.3% of healthy women. Moreover, women with CAD had a lower frequency of sexual intercourse per month than women without CAD (2.2 versus 5.2) (Kaya et al., 2007). Such data provides evidence that a notable proportion of patients who have MI have suffered emotional, physical or social issues after a cardiac event and that their quality of life has been influenced negatively. Measuring changes in HRQL is an important component of evaluating secondary prevention programs for CVD patients (Dempster, Donnelly, & O'Loughlin, 2004). Additionally, improving health-related quality of life for cardiac patients is one of the major goals for cardiac rehabilitation and secondary prevention programs (Dempster et al., 2004).

There is consensus across a number of studies that cardiac events do negatively influence patients' quality of life. However, to the author's knowledge there are few Saudi studies available which measure patient characteristics, including health-related quality of life after a cardiac event (Hodges et al., 2007; I. Johansson et al., 2010; Keyes, 2004; Lane et al., 2001; Li et al., 2008; Strik et al., 2003; White & Groh, 2007; Whooley, 2006). This study will help to fill the gap by examining the health-related quality of life for Saudi patients after a cardiac event. This knowledge will provide evidence to guide the development of secondary prevention programs, specific to the Saudi context.

Having reviewed the impact of CVD, risk factors, secondary prevention of this disease, and health-related quality of life, the next section will present a review of literature related to the Ecological Model of Health behaviour.

2.8 THEORETICAL FRAMEWORK: ECOLOGICAL MODEL OF HEALTH BEHAVIOUR

2.8.1 Introduction

CVD is the leading cause of death throughout the world (WHO, 2013a). The most prominent contributing factors to this mortality relate to behavioural factors. Specifically, tobacco use, unhealthy diet, and physical inactivity have been repeatedly shown to increase the risk of developing chronic diseases like cardiovascular disease (WHO, 2013a; Lloyd-Jones et al., 2009). In recent years, greater attention has been focused on lowering and preventing morbidity and mortality through the adoption of approaches to change these lifestyle behaviours (Glanz, Rimer, & Viswanath, 2008). Various theories and models have been developed to provide a framework to help identify targets for change and the best methods for accomplishing these changes (Simons-Morton, McLeroy, & Wendel, 2012). Selection of the most appropriate theories and models are based on their best fit to different units of practice, such as individuals, groups and organisations (Glanz et al., 2008). The Health Belief Model, for example, focuses on the role of the individual in health behaviour and is used to explain change and maintenance of health-related behaviour (Champion & Skinner, 2008). Moreover, Social Cognitive Theory focuses on interpersonal interactions (McAlister, Perry, & Parcel, 2008). This theory argues that both individuals and their environments are interacting and influencing each other, leading to individual and social change (McAlister et al., 2008). This theory also focuses on people's ability to construct environments to suit their purposes. Furthermore, the Diffusion of Innovation model focuses on the community's and group's role in behavioural change (Oldenburg & Glanz, 2008).

This model helps to understand factors that support and inhibit the uptake of effective programs and policies.

Therefore, while the different theories of health behaviour vary in their emphasis, they typically highlight that behavioural changes are influenced by individual, interpersonal, and/or community and group level factors (Glanz et al., 2008). However, these theories miss important factors that are not included in their scope but, nevertheless, play an important role in shaping health behaviour. The ecological model was developed to incorporate constructs from the health behaviour models, including psychological, social and/or organisational levels of influence to provide a comprehensive and inclusive framework that allows the consideration of these multiple levels of influence. The following section describes the Ecological Model of Health Behaviour, the background for this model, and the relevance of this model for the present study.

2.8.2 Ecological Model of Health Behaviour

The ecological model is defined as "a theoretical framework designed to draw attention to individual and environmental determinants of behaviour" (McLaren & Hawe, 2005, p.9) Ecological models of health behaviour emphasise a shift in focus from individual characteristics and the proximal social influences, such as the family, to include the wider influences of community, organisation, and policy on health behaviours (McLeroy et al., 1988; Richard, Potvin, Kishchuk, Prlic, & Green, 1996; Sallis et al., 2008). Ecological models are based on the assumption that the individual's characteristics alone, such as knowledge, attitudes and skills have limited value for understanding and examining personal behaviour and health-related behaviour (McLeroy et al., 1988; Sallis et al., 2008; Stokols, 1996). As such, ecological models emphasise the wider physical and socio-cultural environment surrounding an individual along with their personal characteristics for providing an in-depth understanding of individual behaviour (Stokols, 1992).

In the ecological approach, the environment and behaviour are not considered separate entities. Rather they function as reciprocal determinants in which an individual and environment interact together over time to determine each other (McLeroy et al., 1988). Evidence supports that environmental changes result in behavioural changes, and behavioural changes result in changes in the environment (Simons-Morton, 2013). The ecological model further assumes that appropriate change in the social environment will lead to changes in the individuals, and that an individual needs support for implementing environmental change

2.8.3 Background for Ecological Models

The term ecology is derived from biological science and refers to the relationship between organisms and their environments (Stokols, 1992). The initial application of ecological models was to study the relations between plants and animal populations and their natural habitats (Stokols, 1996). Then, it was extended to the study of human interactions with their physical and socio-cultural environment in the field of behavioural science, biology, sociology, psychology, education, and public health (Stokols, 1996). Urie Bronfenbrenner (1979), an influential developmental psychologist, was one of the first researchers to define the social ecology of human development as a dynamic and reciprocal interaction between human development and environment at multiple levels.

Bronfenbrenner (1979), in his work on the Ecology of Human Development described the multiple layers of environment which influence human development. Bronfenbrenner considers that human behaviour occurs within multiple systems of environmental influences. These systems range from microsystems to broader mesosystems, exosystems and macrosystems (Bronfenbrenner, 1979). In Brofenbrenner's model, the microsystem refers to face-to-face influences, such as interactions within the immediate family, and social relationships. The mesosystem refers to the interrelations among various settings in which the individual is involved, such as family, school, and church. The exosystem refers to the various settings in which individuals are not involved as active participants, such as a parent's worksite. The macrosystem refers to the cultural beliefs and values that influence both the micro and macro systems (Bronfenbrenner, 1979).

Bronfenbrenner (1979) argued that the characteristics of these multiple systems have effects on an individual's beliefs and behaviours and the individual in turn has effects on these systems. The study of these different systems and layers is referred to as levels of analysis. This analysis is not only about the characteristics of each layer of the system but also about the interactions between these layers, which have an effect on an individual's behaviour. It has been argued that the most influential level to human behaviour is at the microsystem level, which includes both physical and social characteristics (Spence & Lee, 2003). Therefore, interventions that promote a particular behaviour should be targeted at the microsystem (intrapersonal and interpersonal) level because it will have a direct impact on human behaviour.

Following Bronfenbrenner's (1979) original work, several authors reconceptualised Bronfenbrenner's level of analysis in different ways to be more appropriate to their context, setting, perspective or intervention. McLeroy et al. (1988), for example, identified five sources of influence (intrapersonal, interpersonal, organisational, community and public policy), which are closely aligned with Bronfenbrenner's levels of analysis. The focus in McLeroy et al.'s model is, however, more on the social system within which people exist. In fact, while the earlier version of the ecological model was more about human ecology with a focus on biological processes and the geographical environment, recent models give greater attention to social ecology and its focus on the relationships between social, organisational, and cultural contexts of people and the environment (Stokols, 1996).

According to Sallis et al. (2008), ecological models are similar to systems models in which the social environment is divided into analytic levels that can be used to focus attention on different levels and types of social influences to develop appropriate interventions. However, the emphasis in the ecological model is more on individual behaviours as the outcome of interest, whereas systems theories focus on the broader outcomes of system functioning or production (McLeroy et al., 1988). Thus, although different models specify different category levels of influence with different components for each, they share the emphasis that the multiple levels of influence are shaping an individual behaviour and there is interaction between these influences which also has an effect on an individual's behaviour (Fisher et al., 2005; Spence & Lee, 2003).

Thus, McLeroy et al.'s (1988) ecological model concentrates upon describing the multiple levels of influences on human behaviour from a social perspective. It is therefore a relevant and appropriate model to examine engagement in secondary prevention practices for Saudi people following a recent cardiac event. In addition, this model assists in providing an in-depth understanding of Saudi patient's perspectives and behaviours related to such practices. An understanding of the multilevel influences provides fundamental information to help formulate appropriate planning and intervention strategies (McLeroy et al., 1988).

2.8.4 Relevance of McLeroy et al.'s (1988) Ecological Model for the Present Study

McLeroy et al.'s (1988) Ecological Model of Health Behaviour has been selected for the present study for a number of reasons. Firstly, earlier descriptions of such models were applied broadly to behaviour. More recent models including McLeroy et al.'s (1988), were developed however to apply to health behaviour (e.g. physical activity and healthy diet) and health promotion (Sallis et al., 2008). For example, McLeroy et al.'s (1988) ecological model has been applied to different behavioural factors such as physical inactivity, obesity and tobacco use to identify the multiple levels of influence on human behaviour and thereby guide the multi-level interventions to promote these health behaviours. In fact, since the 1960s, the popularity of the ecology model has increased due to the success that the model had achieved in reducing tobacco use in the United Sates (Sallis et al., 2008). As a result, the Ecology Model of Health Behaviour was seen as a desirable model to apply to many health problems and health behavioural issues (Sallis et al., 2008). Because the focus of this study is CVD, a condition for which behavioural factors play an important role, this model provides a better way of understanding the multiple levels that influence Saudi patients' behaviours. This is fundamental information to help formulate appropriate planning and intervention strategies in the future.

Secondly, according to Sallis et al. (2008), more research is applying the constructs of ecological models of health behaviour, as these models are designed to be applicable to many health behaviours. Some ecological models are designed with a more specific focus and are tailor-made for specific categories of health behaviour, such as Fisher et al.'s (2005) model for diabetic patients. Fisher et al. (2005) have applied the ecological model to illustrate the impact of multiple level interventions for diabetes self-management. Fisher et al.'s (2005) review found that self-management from an ecological perspective requires access to key Resources and Supports for Self-Management (RSSM) needed by diabetic patients. These keys are: individualised assessment, collaborative goal setting, skills enhancement, follow-up and support, access to resources, and continuity of quality clinical care. Additionally, these key resources and supports correspond to the behavioural influences in the ecological model level. For example, individualised assessment and collaborative goal setting tend to address the influencing factors at intrapersonal or individual level. The ecological RSSM model thus provides a framework to identify key factors influencing self-management.

Finally, a review by Sallis et al. (2008) revealed that there has been increased application of the ecological model in health education and health promotion research in the past two decades. Moreover, this model is considered the central theme of a new approach in public health. For example, in health behaviour research, the general acceptance of ecological models has been reflected in authoritative documents that guide public health programs nationally and internationally. Examples of these documents are Healthy People 2010 by the U.S. Department of Health and Human Services, Institute of Medicine (IOM) reports on health behaviours, childhood obesity prevention programs; the WHO strategy for diet, physical activity, and obesity; and the WHO Framework Convention on Tobacco Control.

Behavioural factors are major contributors to CVD. Mcleroy et al.'s (1988) Ecology Model of Health Behaviour is therefore an appropriate and relevant model for the present study to examine the provision of secondary prevention practices for Saudi people following a recent cardiac event. In addition, the model is also useful to provide a better understanding of the multiple levels of influence on Saudi people's behaviour relating to secondary prevention practices. This is because human behaviour is shaped by multiple factors including personal knowledge, social networks, organisation, community and policy factors.

2.8.5 Ecological Perspectives on Health Behaviour Change

Four core principles of ecological model of health behaviour have been identified by McLeroy et al. (1988) as follows: There are multiple levels of factors influencing specific health behaviours; influences on behaviour interact across these different levels; multi-level interventions should be most effective in changing behaviour; and ecological model should be behaviour-specific, identifying the most relevant potential influences at each level. The following section discusses the core principles of the ecology model of health behaviour.

1. Multiple levels of factors influence health behaviours:

The first principle of an ecological approach is that there are multiple levels of factors that influence health behaviours. In fact, ecological models have been distinguished from other health behaviour theories and models by their focus on multiple levels of factors that influence health behaviour. Additionally, these multiple levels of influence in the models enable exploration of a wide range of interventions that may be needed to promote behaviour change. These multiple levels often include factors that act at the intrapersonal, interpersonal, organisational, community and public policy levels (Figure 2.3). Therefore, the first core principle of McLeroy et al's (1988) ecological model underpins the theoretical framework for the present study as it allows a complex view of the different levels that could influence Saudi Arabian cardiac patients to participate in secondary prevention practices. The multiple levels of influence are explored below under headings to illustrate how the theory can guide the collection and analysis of data.

Intrapersonal (Individual) Factors

Intrapersonal (individual) factors are considered the most influential factors in health related behaviour and behaviour change (Whittemore, Melkus, & Grey, 2004). This level focuses on expressed behavioural choices and individual characteristics that influence behaviour such as knowledge, attitudes, beliefs, skills and personal traits. Strong relationships have been identified between individual characteristics and a wide range of behaviours (McLeroy et al., 1988; Norris, Engelgau, & Narayan, 2001; Sallis et al., 2008; Simons-Morton et al., 2012; Whittemore et al., 2004). For instance, the ability of individuals to change their behaviours to optimise health in many chronic diseases like CVD is influenced by knowledge, attitude, beliefs, and skills. Therefore, examining individual characteristics at the intrapersonal level can contribute to an understanding of how individual characteristics affect behaviour (Simons-Morton et al., 2012).

In relation to CVD, a number of studies have reported that patients' knowledge and attitudes of CHD risk factors are positively correlated with compliance with behaviour change (Alm-Roijer, Stagmo, Udén, & Erhardt, 2004; Chan, Lopez, & Chung, 2011; Eshah, Bond, & Froelicher, 2010). For example, Alm-Roijier et al.'s (2004) study reported success in changing health behaviours through improving patients' knowledge about CVD risk factors, such as reducing weight ($p = .040$), increasing physical activity ($p = .050$), managing stress ($p = .040$), and changing diet ($p < .001$). The study also reported that sufficient knowledge about CVD risk factors could influence patients' decisions to take prescribed blood pressure-lowering drugs ($p = .030$) (Alm-Roijier et al., 2004). This study is one of the many studies that

Figure 2.3. McLeroy et al.'s (1988) Ecological Model of Health Behaviour

address the significant correlation between improving the knowledge of CVD risk factors and adoption of a healthier lifestyle with subsequent reduction in morbidity and mortality rates (Aldana et al., 2005; Celentano et al., 2004; Eshah, et al., 2010; Galbraith, Mehta, Veledar, Vaccarino, & Wenger, 2011; Kuller et al., 2006; Mosca et al., 2006; Villareal et al., 2006; Wartak et al., 2011; Wister et al., 2007).

Results from previous studies suggest that general knowledge and attitude toward disease is the first step toward taking action to reduce the threat of this disease (Mosca et al., 2006). In addition, patients' knowledge and attitude about CVD risk factors is the best motivation for patients to increase prevention seeking behaviour (Galbraith et al., 2011; Wartak et al., 2011). Previous studies found that achieving the successful goal in modifying CVD risk factors and improving adoption of healthy behaviours could be through improving public knowledge and guiding the adoption of healthy behaviours through counselling and behavioural interventions (Eshah et al., 2010). Prior to implementation of CVD secondary prevention and interventions in the Saudi context, an assessment of cardiac patient knowledge is an essential approach to enable the design of resources that are relevant to behavioural change.

Other studies have reported contradictory findings, suggesting that knowledge of cardiovascular risk factors may not be necessary for an individual to change and maintain healthy behaviour (Dao, Nguyen, & Dao, 2008; Andersson, Sjöberg, Öhrvik, & Leppert, 2006; Kang, Yang, & Kim, 2010). Andersson et al.'s (2006) study, for example, was conducted with a large sample size *(n = 1011)* to examine knowledge about cardiovascular risk factors among obese individuals. The aim of this study was to examine the assumption that obese individuals have a lack of knowledge about CVD risk factors compared to the general population, and that understanding that obesity is one of CVD risk factors is positively related to behavioural changes in order to avoid obesity. Andersson et al. (2006) found no difference in knowledge levels about risk factors for CVD between obese individuals and individuals of normal weight. This finding is consistent with other Saudi studies conducted earlier (Al-Haqwi et al., 2010; Khattab et al., 1999). Khattab et al. (1999), for example, found that a high proportion of heavy smokers and obese people were aware of the harmful effects of smoking and obesity on their health and of the positive benefits of changing their behaviours. The authors argued that a failure to reduce the CVD risk factors among participants was because of a lack of supportive health care programs. These findings emphasise that knowledge alone may not be sufficient to change behaviour and that other factors and levels of influence need to be considered (Andersson et al., 2006). Therefore, incorporating more than one level of influence may assist in examining the reasons behind Saudi patients' behaviours related to their CVD.

Interpersonal Factors

Interpersonal relationships with other social networks, such as family members, friends and neighbours also have an influential role in health-related behaviour of individuals (McLeroy et al., 1988). Additionally, the positive influence of social networks and social support on individuals' health behaviour has also been well documented (Emmons, 2000; McLeroy et al., 1988; Whittemore et al., 2004). It has been argued that social relationships can provide individuals with social identity, social support, information, and emotional support. McLeroy et al. (1988), for example, noted that social relationships can influence health-related behaviours through influencing a patient's health decisions, such as visiting a physician for non-emergency care, timing of doctor visits, coping with stress, and the decision to maintain alcohol and drug use behaviours. It has been noted that an individual's knowledge, attitudes and behaviours toward disease or objects will be influenced by their relationship with others and others' attitudes and behaviours toward the same object. For example, it has been found that adolescent tobacco use is influenced by the information that an adolescent receives from other people regarding tobacco use and the availability of the product (Simons-Morton et al., 2012). Moreover, social networks, such as family and peers, have been found to influence individuals' health behaviours through role modelling. Therefore, social networks surrounding an individual are one factor that helps shape the individual's behaviour.

In earlier years, several studies were conducted and confirmed the relationship between social support and mortality associated with diseases, such as cardiovascular disease (Berkman & Syme, 1979; Lett et al., 2005; Uchino, 2004, 2006; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). These studies reported higher mortality rates for people who had fewer social interactions. It has also been confirmed that there is a link between social support and better physical health outcomes (Berkman, Glass, Brissette, & Seeman, 2000; Cohen & Wills, 1985; House, Landis, & Umberson, 1988; Seeman, 1996; Uchino, 2004). Studies have also provided evidence that improved social support is associated with greater adherence to medical recommendations and other health promoting behaviours (Doherty, Schrott, Metcalf, & Iasiello-Vailas, 1983; Giannetti, Reynolds, & Rihn, 1985; Härtel, Stieber, & Keil, 1988; Oka, King, & Young, 1995).

Epidemiological studies have also confirmed that a high rate of mortality is associated with lower social support, especially mortality from cardiovascular disease (Berkman, Leo-Summers, & Horwitz, 1992; Brummett et al., 2001; Frasure-Smith et al., 2000; Kaplan et al., 1988; Orth-Gomér, Rosengren, & Wilhelmsen, 1993; Rutledge et al., 2004; Williams et al., 1992). Rutledge et al. (2004), for example, conducted a study to examine the association between social relationships and coronary artery disease (CAD) risk and mortality among a sample of women with suspected CAD. It was found that women who had high social network scores, had reduced CAD risk, including lower blood glucose levels ($p = .03$), lower smoking rates ($p = .002$), lower rates of hypertension ($p = .04$). Additionally, the mortality rates in Rutledge et al.'s (2004) study were twice as high for the women with low social network scores ($p = .03$).

Previous studies have identified two broad domains for the social support: structural and functional support (Cohen, Brissette, Skoner, & Doyle, 2000; Lett et al., 2005; Uchino, 2004, 2006). Structural support refers to the size, type, and density of the social network surrounding an individual. These variables can be measured through identifying marital status, the number of close contacts, frequency of interaction and group or church membership (Cohen et al., 2000; Lett et al., 2005; Uchino, 2004, 2006). Functional support refers to the support that an individual receives from social structure, such as information, financial and emotional support. It has been argued that structural and functional social support can influence morbidity and mortality through two pathways (Cohen et al., 2000; Lett et al., 2005; Uchino, 2004, 2006). The first way in which social support can influence morbidity and mortality of diseases is through behavioural processes. Social support works as a health promoting factor to facilitate healthier behaviour, such as exercise, eating healthy food, not smoking, and adherence to medical regimens (Cohen et al., 2000; Lett et al., 2005; Uchino, 2004, 2006).

The second possible way in which structural and functional measures of social support can influence the disease process is through psychological processes which are linked to emotions or moods (depression) and feelings of control (Cohen et al., 2000; Lett et al., 2005; Uchino, 2004, 2006). Previous studies have stressed that there is a strong link between social support and psychological processes. However, there is a lack of evidence on the direct role of these psychological processes on health outcomes. Moreover, many researchers assume that an individual's behaviour and psychological state is linked. For instance, feelings of stress can have negative effects on health behaviour (Ng & Jeffery, 2003; Uchino, 2006). Additionally, health behaviours such as exercise can have positive effects on feelings of stress (Uchino, 2006). Furthermore, studies have reported that a person's psychological state and their behaviours have reciprocal influence on social support processes. For example, feeling stressed may influence perceptions of support and thus lead to negative social interactions (Uchino, 2006).

Consistent findings from early studies have provided evidence for the role of social support in the development and progression of cardiovascular disease. The results of some studies confirm that the lack of structured social support is strongly associated with an initial cardiovascular event (Orth-Gomér et al., 1993; Vogt, Mullooly, Ernst, Pope, & Hollis, 1992). Others studies have found that a lack of emotional support has an effect of developing a cardiac event (Orth-Gomér et al., 1993; Rosengren, Hawken et al., 2004; Rosengren, Wilhelmsen, & Orth-Gomér, 2004). More recent studies have investigated the relationship between social support and atherosclerosis (Angerer et al., 2000; Knox et al., 2000; Kop et al., 2005; Wang, Mittleman, & Orth-Gomer, 2005). These studies have confirmed that social support is associated with underlying atherosclerosis.

It has also been argued that social support plays an important role in the progression of diagnosed cardiovascular disease (Brummett et al., 2001; Horsten, Mittleman, Wamala, Schenck-Gustafsson, & Orth-Gomer, 2000; Murberg & Bru, 2001; Ruberman, Weinblatt, Goldberg, & Chaudhary, 1984). These studies have included different structural support measures such as network size, marital status, or participation in social activities. On the other hand, results of some studies have shown that functional support measures are more prognostic than structural measures and the main effect for the functional support domain is emotional support (Berkman et al., 1992; Gorkin et al., 1993; Welin, Lappas, & Wilhelmsen, 2000). Social support can therefore influence an individual's health, including developing a cardiac event or progression of diagnosed CVD.

Organisational Factors

Organisational structure and processes are also purported to significantly influence an individuals' health and health behaviour (McLeroy et al., 1988). Organisations include places where individuals attend school, work, and health care settings where they receive health-related services (McLeroy et al., 1988). It is argued that organisations play an important role in health promotion and disease prevention when they provide services to their members directly through programs, such as smoking cessation and weight reduction programs, or indirectly through insurance for health promotion services (Simons-Morton et al., 2012). Organisations also have roles in providing essential resources for interventions, organising and delivering health promotion interventions frequently, and providing critical resources that are essential for planning and applying the health promotion programs (Simons-Morton et al., 2012). The critical role of the organisations in behavioural change is that organisations provide access to a large group of people and provide them with multiple resources and services to improve the health of organisational members (Simons-Morton et al., 2012). Consequently, in the last two decades, there has been an increase in attention given to evaluating, developing and implementing health promotion programs in specific settings, such as health care organisations.

According to Simons-Morton, McLeroy, and Wendel (2012), successful organisational assessment should include assessment of other organisations or settings that may influence behaviours. In organisational assessment it is useful to include other organisations or settings, such as community services (police, public health), political structures (local government), community-based organisations and services (churches, neighbourhood organisations), employers, educational systems, food services, housing, and social and health services. For example, for school health promotion programs it is important to include not only an educational curriculum that targets students but also food services, physical activities, programs for faculty and staff, community and family involvement, social environment, and counselling services (Simons-Morton et al., 2012).

Moreover, adaptation to health programs, policies and practices are usually the goals of intervention at the organisational level. Therefore, it is important to have a commitment from organisational leadership to determine whether this program is targeting the employees only or the broader community. Additionally, adaptation of any programs needs staff, the establishment of policy and procedures, the recruitment of participants and an establishment timeline. However, the present study is limited to an investigation of factors at an organisational level only for an understanding of this particular level. Further research is required in the future to adapt healthful programs, policies, or practices to Saudi organisations.

Community Factors

The community level of influence is the fourth level of influence on health behaviours. The concept of community has been defined in many ways. McLeroy et al. (1988) have identified three meanings of community: first, community refers to the "mediating structure", which includes family, church, social network and neighbourhoods who provide social support. Second, community refers to the relationships among organisations within a geographic region. The third meaning of community is the power structure which is more political and includes funding, staffing and official approval. Simons-Morton et al. (2012) have argued that the community level focuses on the community as a location or setting where health programs are carried out. Health promotion programs include smoking cessation, physical activity, and safety programs which are being carried out in and by community organisations, such as churches, health care clinics and heart disease associations (McLeroy et al., 1988). Community characteristics or factors that are important in changing behaviour include leadership, citizenship, skills, resources, and interpersonal networks (McLeroy et al., 1988). For example, over the last two decades, community-based CVD prevention programs have been developed and evaluated to determine their effectiveness in reducing the prevalence of CVD risk factors and thus reducing the incidence, morbidity and mortality of CVD (Shea & Basch, 1990). These programs were conducted in Finland, Pawtucket, Rhode Island, in five cities near California. The five community programs shared the same hypothesis, that intervention strategies can reduce the CVD risk factors, such as smoking, hypertension and serum cholesterol level, which will lead to a reduction in the incidence of CVD (Shea & Basch, 1990). The intervention strategies that were used in these programs included community mobilisation, social marketing, school-based health education, and screening and referral education (Shea & Basch, 1990). The review of the five community-based cardiovascular disease prevention programs indicated that there is strong support for community interventions in reducing the prevalence of CVD and CVD risk factors. This community program reported a reduction in risk factors by 17.4% for men and 11.5% for women in five years (Shea & Basch, 1990). Additionally, cardiovascular disease mortality was reduced by 13% for men and 31% for women in five years (Shea & Basch, 1990). Therefore, for the purpose of this study the community level of analysis focuses on the Saudi Arabian community as a location and setting where health programs will be carried out.

Public Policy Factors

The last level of influence in the ecological model is the public policy level which includes local, state, and federal policies that can support and regulate the individual and organisational behaviours (Simons-Morton et al., 2012). More attention has been paid to public policies to achieve the goals of public health and influence individual and organisational behaviours, although the effectiveness of these varies (Simons-Morton et al., 2012). To illustrate this, in order to control tobacco use in the United States, policies have been developed to influence an individual's behaviour through restricting smoking in public spaces, raising the tax on cigarettes and restricting tobacco advertising, and thus the use of tobacco among the US population. These polices have resulted in a reduction of smoking by more than 50% since the 1960s (Sallis et al., 2008). Furthermore, the United States has been successful in reducing the mortality rate between 1900 and 1973 from infectious diseases as a result of using laws and regulatory policies, such as improving water supply and sanitation (Institute of Medicine, 2001). The popularity of the policy approach in addressing major public health problems is also evident in polices to address obesity and physical inactivity and to achieve public health goals. These sources of influence on individuals' behaviours not only effect behaviour but also are a part of a system in which each level affects the others. Additionally, it has been noted that public policies can affect access to health promotion resources through developing of eligibility criteria and establishing how these resources can be used (Simons-Morton et al., 2012). Moreover, increasing public awareness about specific health issues and prevention processes is considered one important public policies activity (Simons-Morton et al., 2012).

2. Influences interact across levels:

The second core principle of ecological models is that influences on behaviour interact across the different levels, which means that the variables work together. To illustrate this, providing individuals with education and motivation to be physically active may work better if the environment and policies support healthy choices through providing individuals with support, like physician counselling and insurance discounts for engaging in regular activity. In addition, it has been argued that because of the multiple levels of influences that s include, and also the multiple variables at each level, it may be difficult to identify which of the possible interactions between levels are most important or how variables interact across levels. Thus, it is important for researchers to expand their understanding of this interaction across levels.

3. Multi-level interventions should be most effective in changing behaviour:

The third core principle of the ecological model is that multi-level interventions should be most effective in changing behaviour. From this perspective the argument is that multiple level interventions have more powerful effects than single level interventions. For example, many studies have been conducted and have considered only individuals as targets of the intervention. These studies have shown that individual-focused interventions have short-term effects. For example, educational interventions designed to change individual behaviour work better if supported with policies and environmental interventions like communication and motivational campaigns. Furthermore, it has been stressed that policy and environmental interventions are more effective in changing behaviours than individual interventions (Sallis et al., 2008). For example, there is evidence that tobacco use has been reduced in the United States since the 1960s and that this is a result of the combination of intervention strategies, such as the environment, policy, social and individual intervention strategies (Institute of Medicine, 2001).

4. Ecological models are most powerful when they are behaviour specific:

The fourth core principle is that ecological models should be behaviour-specific. In other words, ecological models are thought to be most powerful when they are used to target specific health behaviours and are thus more useful to guide research and intervention. For example, the environments that provide customers with condoms in night clubs have little relevance to sun protection behaviour. Therefore, it is important to identify variables that are specific to each behaviour. General ecological models can be used as the basis for developing behaviour specific models that are needed for application to research and intervention.

2.8.6 Theoretical framework for the Present Study

The theoretical framework for the present study was guided by Mcleroy et al.'s (1988) Ecological Model of Health Behaviour and informed by the literature review on secondary prevention for CVD. More specifically, the study's framework includes multiple levels of factors that can influence health behaviours as broad concepts of interest to the present research. Within each broad concept, specific variables relating to the concept are defined based on the theoretical framework and empirical literature. For example, knowledge, attitudes and behaviours are included as specific measures of the intrapersonal (individual) influencing factors; these are derived from McLeroy et al.'s framework. Furthermore, care processes that cardiac patients received at in-patient, outpatient, and ongoing prevention stages are also included as specific measures of the organisational factors which are also derived from McLeroy et al.'s framework and informed by the literature review on secondary prevention practices for cardiac patients. Additionally, the impact of other interpersonal, community and public policy factors are considered by reference to key literature on cardiac diseases and secondary prevention practices for cardiac patients in Saudi Arabia. Moreover, health-related quality of life is included as a major outcome following a cardiac event which is informed also by the literature review.

Factors at intrapersonal and organisational levels will be measured in the present study by using instruments as following. The impact of the other three levels (interpersonal, community and public policy), however, will be considered by reference to the literature. At the intrapersonal level the WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** questionnaire was used to assess patients' knowledge of and attitudes towards cardiovascular disease, risk factors, and healthy lifestyle, including diet and exercise. Adherence to a treatment plan and barriers to taking medications were also examined. Saudi patient's knowledge was assessed by the WHO-PREMISE questionnaire through asking participants about their understanding of the importance of preventing a heart attack by following a healthy diet, quitting smoking, and engaging in regular physical activity.

At the interpersonal level the empirical literature was used to examine the role of family members and health care professionals in influencing individuals' health behaviours. Factors at the organisational level were assessed through audit tool that examined the care processes that comprise secondary prevention practices that are provided by Saudi Arabian health services for cardiac patients following a recent cardiac event within three to six months. This area was examined to compare the practices that are provided in Saudi Arabia with those specified in relevant international guidelines. In the present study, the services that Saudi cardiac patients receive in hospital as inpatients, in the follow-up period as outpatients, and in the ongoing prevention of cardiac problems was assessed. More specifically, patients' physical activity interventions, supportive counselling, referral plans, and ongoing health monitoring performed by health professionals was reviewed. A retrospective audit tool adapted from international guidelines for secondary prevention practices was used in this assessment (for more details about the data collection instruments please refer to the Research Design Chapter). The audit tool collected data to inform the assessment of secondary prevention practices that are provided in Saudi Arabian health services following a recent cardiac event at organisational level. In addition, a structured interview was undertaken to provide additional data for assessing the secondary prevention practices that patients received in Saudi Arabian health services.

While this study did not specifically collect empirical data relating to the influence of community level and public policy level factors, the influence of these factors are considered through examination of relevant literature pertaining to the Saudi Arabian community and the lifestyles, and Saudi Arabian policies regarding cardiovascular diseases and the secondary prevention practices for cardiac patients. This enabled a comprehensive consideration of the multilevel influences that influence on cardiac patients health behaviours.

The present study also assessed health-related quality of life as an outcome of a cardiac event as it is one of the major goals for secondary prevention programs. The tool used to assess this outcome was the MacNew Heart Disease Health-related Quality of Life instrument. A large body of literature has confirmed that cardiac patients commonly experience negative impacts on their quality of life, including physical, emotional and social changes following the cardiac event (Hodges et al., 2007; P. Johansson et al., 2010; Keyes, 2004; Lane et al., 2001; Li et al., 2008; Strik et al., 2003; White & Groh, 2007; Whooley, 2006). These studies have highlighted that depression after cardiac events has a negative impact on individuals' health behaviour, diseases outcomes including increased mortality and morbidity, delays in resuming activities and rehospitalisation (Ågren et al., 2011; Keyes, 2004; Lane et al., 2001; Strik et al., 2003; White & Groh, 2007; Whooley, 2006). Depression is three times more common in cardiac patients than in the general population (Hodges et al., 2007). The main concerns for cardiac patients are losing their lives, physical disability and a further cardiac event (Ågren et al., 2011; Keyes, 2004; Lane et al., 2001; Strik et al., 2003; White & Groh, 2007; Whooley, 2006). Improving quality of life has been widely recognised as an important goal of cardiac rehabilitation and secondary prevention programs (Dempster et al., 2004). However, evaluating the value of such an intervention is generally lacking. Therefore, addressing this gap is an essential step toward fully understanding the relationship between patient quality of life and health behaviour towards engaging in secondary prevention programs.

In conclusion, while it is widely believed that lifestyle behaviours are personal choices and thus under an individual's control, health behaviours are also influenced by environmental factors (Glanz et al., 2008; Simons-Morton et al., 2012). The ecological model of health behaviour emphasises both individual influence and the wider influences of environment on health behaviour. The ecological model of health behaviour focuses on the individual's characteristics, social networks, organisations, community, and public policy factors that help shape human behaviours. Therefore, the ecological model of health behaviour provides a comprehensive framework that allows consideration of multiple levels of influence. The present study used McLeroy et al.'s (1988) model of health behaviour as a theoretical framework to generate findings that can provide direction for future intervention to improve outcomes for cardiac patients in Saudi Arabia.

2.9 SUMMARY AND IMPLICATIONS

In this chapter, a literature review relating to the impact of cardiovascular disease worldwide has been presented. The risk factors for cardiovascular disease for Western countries and the Saudi population have also been examined. The evidence from the literature confirms that effectiveness of secondary prevention after a cardiac event, but highlights a gap in the extent to which Saudi Arabian people engage in preventive behaviours following a recent cardiac event. The proposed study will examine the health-related behaviours of Saudi people following a recent cardiac event, and explore factors that influence these behaviours. The study will also examine the health-related quality of life for this group of patients. A theoretical framework has been guided by McLeroy et al.'s (1988) Ecological Model of Health Behaviour and informed by the literature review on secondary prevention for CVD has been identified for use in this study. The next chapter will illustrate how the theoretical framework guides the collection and analysis of data for this study.

Chapter 3: Research Design

3.1 INTRODUCTION

The overall aim of this study was to examine the health-related behaviours for Saudi people following a recent cardiac event, and to identify the factors that influenced these behaviours. Chapter 3 describes the design adopted by this research to achieve the study's aim and objectives. It presents the two phases of this study. The chapter provides discussion of the methodology used in the study, the stages by which the methodology was implemented, and the research design. This chapter also provides details of the research setting and the participants in the study. It lists the instruments used in the study, justifies their use and outlines the analysis of the data. The procedures used and the timeline for completion of each stage of the study are also described. The ethical considerations of the research and its potential limitations are noted in this chapter.

This study was conducted in two phases using a quantitative study design (Figure 3.1). In Phase One, two instruments – the WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** questionnaire and the MacNew Heart Disease Health-related Quality of Life were translated into Arabic, and the validity of these instruments was tested and refined. In Phase Two, an exploratory-descriptive approach was used to describe patient characteristics, knowledge, attitudes and behaviour in relation to participation in secondary prevention programs, and the documented practices in Saudi Arabian health services for patients within the 3 to 6 months following a recent cardiac event.

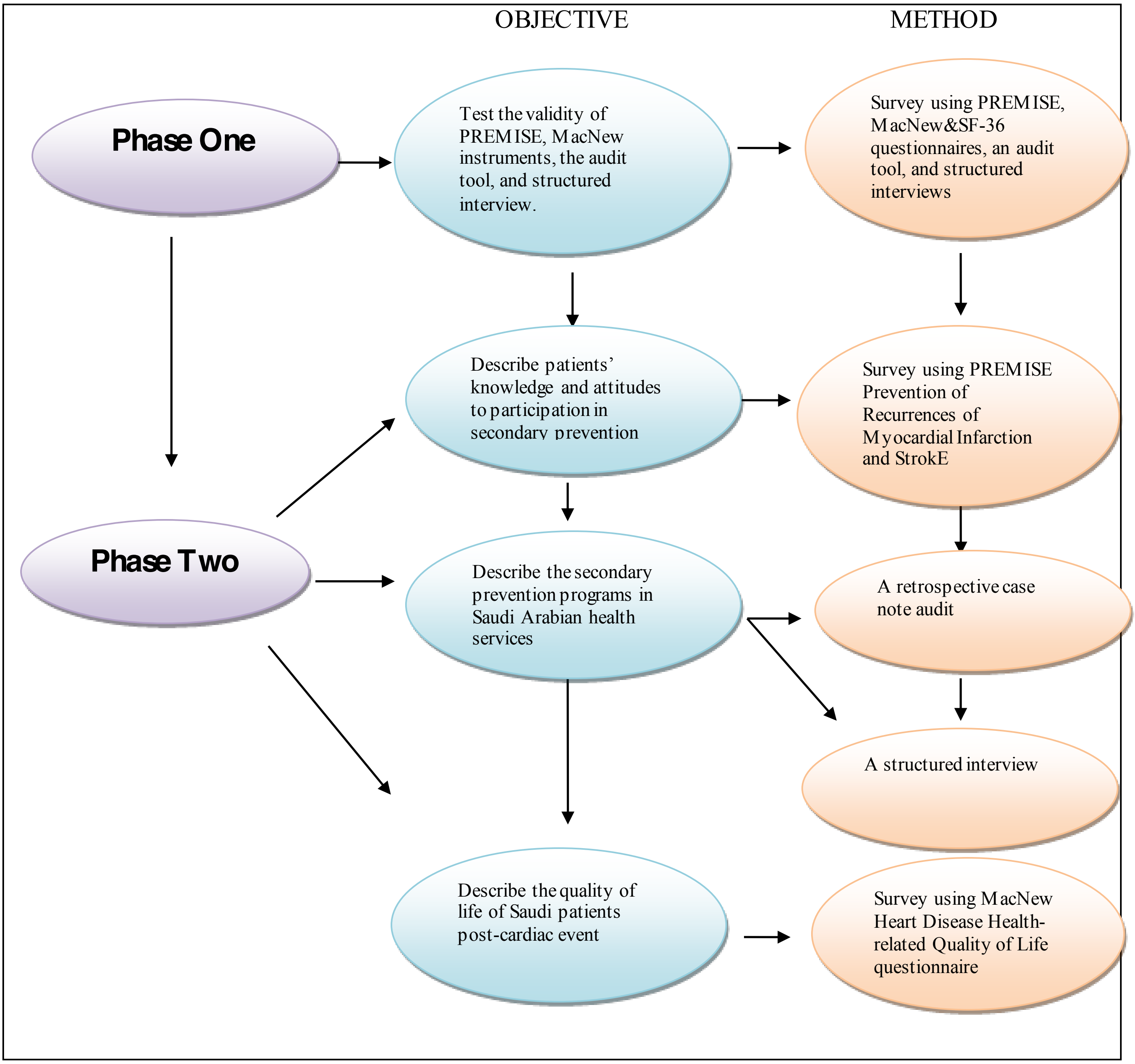

Figure 3.1. An overview of the project's phases and objectives

3.2 PHASE ONE

3.2.1 Phase One Aims and Research Questions

The aim of Phase One was to verify whether the instruments used to assess health-related behaviours and quality of life of Saudi patients, following a recent cardiac event, were valid and reliable for a Saudi Arabian population following translation into Arabic. The instruments used in this phase were the WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** questionnaires and the MacNew Heart Disease Health-related Quality of Life questionnaire. The phase also aimed to verify whether the audit tool and the structured interview were suitable for use in a Saudi Arabian context to assess and document secondary prevention practices provided by Saudi Arabian health services for patients following a recent cardiac event. The following questions were addressed in Phase One:

1. Is the WHO-PREMISE questionnaire a valid instrument to identify Saudi patients' knowledge, attitudes and behaviours relating to participation in secondary prevention practices?
2. Is the audit tool valid and feasible for assessing secondary prevention practices provided by Saudi Arabian health services following a recent cardiac event?
3. Is the structured interview valid for providing additional data for assessing the level of secondary prevention practices used by patients in Saudi Arabian health services?
4. Is the MacNew questionnaire a valid health-related quality of life instrument for measuring the perceived health status of Saudi patients?

3.2.2 Research Design

Phase One of this study was designed to test the validity and reliability of the study instruments (Section 3.2.1)

3.2.3 Research Setting

Data for this study were collected from one government hospital in Saudi Arabia in Jeddah city: King Fahd General Hospital. King Fahd Hospital is the largest government hospital in Jeddah city with a 612-bed capacity. The King Fahd Hospital has six combined medical centres including: a cardiac centre, ear nose and throat centre, kidney centre, dental centre, medical rehabilitation centre and the Prince Sultan Bin Abdul-Aziz Centre for advanced laparoscopic surgery. The King Fahd Hospital has two cardiac clinics and weekly receives more than 150 patients in each clinic visiting the cardiologists.

3.2.4 Research Participants

The eligibility criteria for participants in this study included the following:

Inclusion criteria:

- Male and female Saudi patients, who were visiting the cardiology clinic.
- Were in a stable health condition.
- Were over 18 years old.
- Were able to answer the questionnaire.
- Had had a recent cardiac event and experienced one or more of the following International Classification of Diseases (ICD-9-CM) (2011)

coded cardiac conditions or procedures sometime within the previous 12 months:

- o 410 Acute myocardial infarction (410.0–410.9)
- o 413 Angina pectoris (413.0, 413.1, 413.9)
- o 36 Operations on vessels of heart (36.0, 36.1, 36.2, 36.3, 36.9)
- o 411 Other acute and subacute forms of ischaemic heart disease (411.0, 411.1, 411.8, 411.81, 411.89).

Exclusion Criteria:

- Patients with current or past psychiatric illness.
- Patients younger than 18 years old.
- Patients who were visiting the cardiology clinic for reasons other than a post-cardiac event, such as hypertension.
- Patients who were unable to answer the questionnaire.

3.2.5 Sample Size

Phase One evaluated selected psychometric properties of the MacNew Arabic version based on criteria recommended by the Scientific Advisory Committee of the Medical Outcomes Trust (Scientific Advisory Committee of the Medical Outcomes Trust [SACMOT], 2002). The committee recommended the following criteria be considered in determining the psychometric properties of an instrument: use of a conceptual and measurement model; reliability; validity; responsiveness; interpretability; burden; alternatives modes of administration; and cultural and language adaptation or translations (SACMOT, 2002). As the MacNew questionnaire has been widely used and there is sufficient evidence from various versions of the

MacNew, it is considered to have good validity and reliability (Asadi-Lari, Javadi, Melville, Oldridge, & Gray, 2003; Brotons et al., 2000; Höfer, Benzer, Schüßler, Von Steinbüchel, & Oldridge, 2003; Valenti et al., 1996). Phase One of this study therefore sought to test the psychometric properties which related to reliability, content validity, and criterion validity of the MacNew. Further examination of the construct validity of this instrument through a factor analysis was planned for Phase Two, where a larger sample size was recruited. Kline (2005) has argued that in the assessment of an instrument's reliability, the sample size is of less concern than the sample characteristics because testing reliability is a descriptive statistical test not inferential. For this phase, 60 patients who were visiting the cardiology outpatient clinic were recruited. This number was chosen to enable the researcher to recruit two to three patients daily enabling time with each patient and time to record any issues with the questionnaires. The same patients were followed up via a telephone call two weeks later to enable assessment of test-retest reliability of the instrument. The recruitment for Phase One took place over a six week period (July–Sep, 2012).

3.2.6 Data Collection Instruments

1. The WHO-PREMISE questionnaire

In 2005, WHO published a study on the **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** (WHO-PREMISE Study) (Mendis et al., 2005). This study was undertaken in three low-income and seven middle-income countries (Brazil, Egypt, India, Indonesia, Pakistan, Iran, Russian, Sri Lanka, Tunisia and Turkey). The short-term aim of this project was to evaluate current practices relating to secondary prevention of CVD in these countries. Evidence-based practices were introduced to these countries, and guidelines were adapted at a national scale (Mendis et al., 2005). The present study utilised the WHO-PREMISE questionnaire to identify patient knowledge and attitudes to participation in secondary prevention programs. The questionnaire items covered all aspects of guidelines relating to secondary prevention programs, such as use of pharmacological agents, lifestyle factors, dietary factors, tobacco use, exercise, and individual knowledge of disease. The adapted WHO-PREMISE instrument included 32 items. The pharmacological scale consisted of 11 items which reflect the types of medications that were used, the attitudes and reasons for not using these, the period for which the medications were used, and the cost of the medications. The life style domain assessed information and application of a healthy lifestyle. There were 4 items in these scales. The dietary factors scale evaluated the patient's knowledge about healthy diets and consisted of 7 items. The tobacco use scale helped to identify the smoking status of patients and the frequency of smoking. The exercise domain evaluated the physical activities of patients. The cardiovascular risk factors scale identified the patient's knowledge of their disease. All of these items had categorical responses.

For this part of the study the WHO-PREMISE questionnaire was translated into Arabic and tested for validity (see Appendix A, p. 269). Contact with the questionnaire designers was made and permission to adopt and translate the questionnaire was obtained (see Appendix B, p. 276). Brislin's model of translation and back-translation techniques (1960–1970) was used in the instrument translation. The researchers identified two people, one of whom was a health professional and the other a translator. Both were fluent in Arabic and English and had bachelor degrees. Both also were working in a tertiary health care hospital. One translated the WHO-PREMISE questionnaire from English to the Arabic language and the second one translated back from Arabic to English. The two English versions were checked and were identical.

Pilot testing of the questionnaire in Phase One was conducted. The clarity of the questions, the time to complete the questionnaire and the responses to the questions were tested. The questionnaire was also assessed by seeking feedback from an expert panel of researchers (research supervisors) and two Saudi cardiology consultants who reviewed the instrument along with all other instruments (for more details about the content validity and expert panels please refer to content validity of the MacNew questionnaire section, P. 98). The questionnaire was revised based on Phase One feedback.

2. Record Audits

Record audits were conducted to assess secondary prevention practices provided in Saudi Arabian health services for patients within three to six months following a recent cardiac event. The audit tool was developed from international guidelines of recommended secondary prevention practices of the American Heart Association (AHA)/American College of cardiology (ACC) (Ades, 2001; Balady et al., 2007; Giannuzzi et al., 2003; Smith et al., 2011) and the National Heart Foundation of Australia (National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association, 2004; South Australian Department of Health, Statewide Cardiology Clinical Network, 2010) (see Appendix C, p. 277).

The retrospective case note audit allowed for assessment of current practices relevant to secondary prevention. The audit evaluated practices by reviewing pharmacological and non-pharmacological interventions documented as being provided to patients following a recent cardiac event within the previous three to six months. The audit addressed general information about the patient and three key phases of the patient's care (inpatient, outpatient, and ongoing secondary prevention). The inpatient audit assessed patient healthcare interventions during the initial admission following a recent cardiac event. The outpatient audit (follow-up period) assessed patient healthcare interventions from discharge until six months following a cardiac event. The ongoing prevention audit (referral to community services/other hospital) assessed patient healthcare interventions for the period up to six months from initial admission.

Assessment of the care processes that were provided in Saudi Arabian health services for cardiac patients during initial admission included: taking of a comprehensive medical history (including hypertension, diabetes, CHD, stroke, ACS [angina pectoris, MI], peripheral arterial disease, cardiac surgery, CABAG or CAGS, valve repair/ replacement and kidney disease), and conduct of a physical examination. Moreover, diagnostic or adjunctive health assessment data were observed, such as lipid profile, electrolyte, troponin elevated glucose, CRP-c reactive protein and oxygen saturation. The clinical examination domain reflected other diagnostic tests that might include ECG, exercise stress test, transoesophageal echocardiogram (TOE), chest X-ray, radionuclide scan, and echocardiograms. Protocols for mobilisation were assessed to examine what was offered to patients to return them to an active level. The discharge planning component was also assessed by reviewing whether patients had a documented plan at discharge. The item in this scale consisted of a dichotomous scale response.

For the outpatient assessment, the audit evaluated the time from discharge of patients from hospital until six months following a cardiac event. The audit assessed: assessment, review and follow-up; patients' physical activity; and any referral plan. The items in this scale used a dichotomous scale response. The ongoing prevention audit gathered information on the patient's care for up to six months from initial admission, and assessed referral to community services or other hospital. This was measured using a dichotomous scale.

Although the audit tool was adapted from international guidelines which were supported with evidence, pilot testing of the audit tool was conducted in this study. The researcher pilot-tested the criteria to determine if the audit was feasible for use in a Saudi context to assess secondary prevention practices provided by Saudi Arabian health services following a recent cardiac event. The feasibility and content validity of the audit was also assessed by seeking feedback from an expert panel of researchers (research supervisors), and two Saudi cardiology consultants who reviewed the tool. Specifically, the audit tool was given to expert cardiology clinicians, who were asked to determine if the criteria were clear and comprehensive for assessing the secondary prevention practices in a Saudi context. They were also asked to indicate whether the data were easy to access from the records, if there was any gap or anticipated difficulties in retrieving the data, and if there were other data necessary to assess practices in Saudi Arabian health services. The audit tool was revised based on the feedback received from the expert cardiology clinicians. The retrospective audit was then conducted with the same 60 patients as those enrolled for the survey component to assess the availability of data necessary to assess the level of secondary prevention practices provided by Saudi Arabian services.

3. Structured Interview

The structured interview was designed to provide additional data for assessing the level of secondary prevention practices provided by Saudi Arabian health services for patients after a recent cardiac event. The criteria for this interview were also adapted from international guidelines including the American Heart Association guidelines (Ades, 2001; Balady et al., 2007; Giannuzzi et al., 2003) and National

Heart Foundation of Australia (South Australian Department of Health, Statewide Cardiology Clinical Network, 2010) (see Appendix D, p. 283).

The structured interview sought to gain any additional data to further enhance understanding of the secondary prevention practices that patients received. The structured interview addressed the same three key phases of patient care that were noted previously in the audit tool criteria (inpatient, outpatient and ongoing secondary prevention). Assessment of the secondary prevention practices that were provided for cardiac patients during the initial admission to hospital for a cardiac event included questions about the basic information and education, and supportive counselling that patients received. The basic information and education dichotomous scale assessed the information that patients received on different topics, including psychological implications of illness, medications, wound care, resumption of physical activity, resumption of sexual activity and management of chest pain or other cardiac symptoms. An open question followed these items to allow patients to provide additional data. The supportive counselling scale was also evaluated using a dichotomous scale response to evaluate the supportive counselling patients received in different areas, including nutritional counselling, stress-reduction, diabetes management, physical activity, exercise training and management of social relationships. An open question followed these items to gain additional data.

For outpatient assessment (follow-up period), interview questions evaluated secondary prevention practices for cardiac patients following discharge until six months following a cardiac event. The interviews addressed education, discussion and counselling that patients received at the follow-up visit, such as the effect of heart disease, healing process and recovery, risk factors for heart disease and their modification for secondary prevention (smoking cessation, physical activity, healthy eating choices, and control of blood lipid levels), skills for changing health behaviours, and medications. The items in this scale used a dichotomous response option and then an open question to explore the patient's opinions. The ongoing prevention scale evaluated the secondary prevention practices for cardiac patients up to six months following initial cardiac event, including referral to community services or other hospitals. The items in this scale gathered information on the patient's behavioural changes to reduce cardiovascular disease risk factors. These items used a dichotomous scale followed by an open question.

The interview questions were tested in Phase One to determine if the interview questions were feasible for use in the Saudi Arabian context. The feasibility and content validity of the interview questions were tested using the same process as with the audit tool.

4. MacNew questionnaire

In this phase of the study, the MacNew Heart Disease Health-related Quality of Life Instrument was translated into Arabic and was tested for validity and reliability. Contact was made between the researcher and the questionnaire's designers. There had been no translation of the MacNew instrument into Arabic and approval was given for the researcher to conduct an evaluation as part of this project.

The MacNew Heart Disease Health-related Quality of Life questionnaire (MacNew) has been used to assess and evaluate the health-related quality of life (HRQL) among cardiac disease patients (see Appendix E, p. 290). The MacNew Heart Disease Health-related Quality of Life questionnaire is a self-administered instrument used for assessing and evaluating the effect of heart disease on patients' lives and evaluating the efficacy of treatment (Höfer, Lim, Guyatt & Oldridge, 2004). For example, the MacNew questionnaire has been used to assess HRQL for patients with heart disease including angina, heart failure, and MI (Höfer et al., 2004; Höfer et al., 2012). Additionally, it has been used to evaluate treatments such as cardiac rehabilitation, pacemaker implementation, percutaneous coronary intervention, and coronary artery bypass graft surgery (Daskapan et al., 2008; Höfer et al., 2008; Maes, De Gucht, Goud, Hellemans, & Peek, 2008). The MacNew questionnaire is a modification of the original Quality of Life after Myocardial Infarction (QLMI) tool which was an interviewer-administered questionnaire (Ferrans & Powers, 1985). The MacNew questionnaire consists of 27 items, which identify three domains: a 13–item physical limitations domain scale, a 14–item emotional function domain scale, and a 13–item social well-being functioning scale. There are five items that inquire about symptoms: shortness of breath, chest pain, aching legs, dizzy or light headedness and fatigue. Each item is noted using a seven-point scale where 1 indicates poor HRQL and 7 indicates good HRQL. The average of overall scores are given a Global HRQL score (Höfer et al., 2003). The development of the MacNew instrument was based on measurements of the patients' perceptions of their quality of life and health status before and after treatment (Höfer et al., 2004).

Different generic or disease specific tools have previously been used to evaluate quality of life in cardiac patients, including the short form 36 (SF-36), quality of life index-cardiac version (QLI), and the schedule for the evaluation of individual quality of life (SEIQoL) (Smith, Taylor & Mitchell, 2000). However, the MacNew questionnaire was chosen for this study because of its specificity for evaluating the HRQL for cardiac patients (Asadi-Lari et al., 2003). In addition, the MacNew questionnaire has been widely used across many countries. The MacNew questionnaire has been translated into 28 different language versions, including

Dutch, English, Farsi, German, Chinese, Spanish, Japanese, Hebrew, Brazilian, Norwegian and Flemish (Höfer et al., 2012). Moreover, each of these versions has been evaluated and has demonstrated good validity, reliability and responsiveness (Asadi-Lari et al., 2003; Brotons et al., 2000; Dankner, Burya-Sa'adon, Geulayov, Kobalyov, & Drory, 2011; Hiller, Helvik, Kaasa, & Slørdahl, 2010; Höfer et al., 2003; Nakajima, Rodrigues, Gallani, Alexandre, & Oldridge, 2009; Otsu, Moriyama, & Nakaya, 2010; Valenti et al., 1996; Vandereyt et al., 2012). These good psychometric properties for the MacNew questionnaire have been consistently demonstrated in different languages including English (Valenti et al., 1996), Portuguese (Leal et al., 2005), Dutch (De Gucht, Van Elderen, Van Der Kamp, & Oldridge, 2004), German (Höfer et al., 2005; Höfer et al., 2003), Spanish (Brotons et al., 2000), Chinese (Yu, Thompson, Yu, & Oldridge, 2008), and Norwegian (Hiller et al., 2010) in patients with heart failure, myocardial infarction, angina and cardiac arrhythmias (Höfer et al., 2008). Vandereyt et al. (2012), for example, evaluated the Flemish version of the MacNew questionnaire after they tested this questionnaire on patients from Flanders with angina, ischaemic heart failure or myocardial infarction. Vandereyt et al. (2012) found that the factor analysis in the Flemish version confirmed the factors in the original version of the MacNew explaining 59.8% of the total variance. In addition, the Flemish version was reported as being reliable with a high internal consistency $\alpha \geq .92$ for the global score. Furthermore, the Flemish version was also reported to demonstrate strong validity for assessing quality of life among this group of patients, where logical relationships between items in the MacNew instrument were observed (Vandereyt et al., 2012).

The MacNew questionnaire takes about 10 minutes to complete. Numerous studies suggest that the MacNew instrument is the most appropriate instrument to measure quality of life, effects of disease, and the impact of health-care among patients after a cardiac event (Asadi-Lari et al., 2003; Dixon, Lim, & Oldridge, 2002; Höfer et al., 2004). Permission to use the MacNew questionnaire was obtained from the designers of the questionnaire (see Appendix F, p. 306). The MacNew instrument was translated into Arabic based on the international criteria for assessing health status and quality of life instruments (SACMOT, 2002) (Figure 3.2). The researcher identified two people who were fully bilingual in Arabic and English, one being a health professional and the other not. Both people translated the MacNew questionnaire and the response sets from English to Arabic. The researcher then found another two different people, one of them was a health professional and the second one was not. They blindly translated the instrument back from Arabic to the English version. Both versions which are in the English language were sent to the MacNew designers to determine whether they conformed to the original MacNew questionnaire. The items that were translated accurately were accepted and some of them were translated again into English and sent back to the designers. The translation was checked several times until the process was saturated or no or no new issues arose.

The Arabic MacNew questionnaire was pilot-tested to evaluate the psychometric properties of the Arabic version based on some criteria that are recommended by the Scientific Advisory Committee of the Medical Outcomes Trust (SACMOT, 2002). This phase tested the reliability (internal consistency reliability and reproducibility), and validity (content and criterion validity) of the MacNew instrument in Arabic. Further, the construct validity was evaluated in phase two where a large sample was recruited to enable factor analysis.

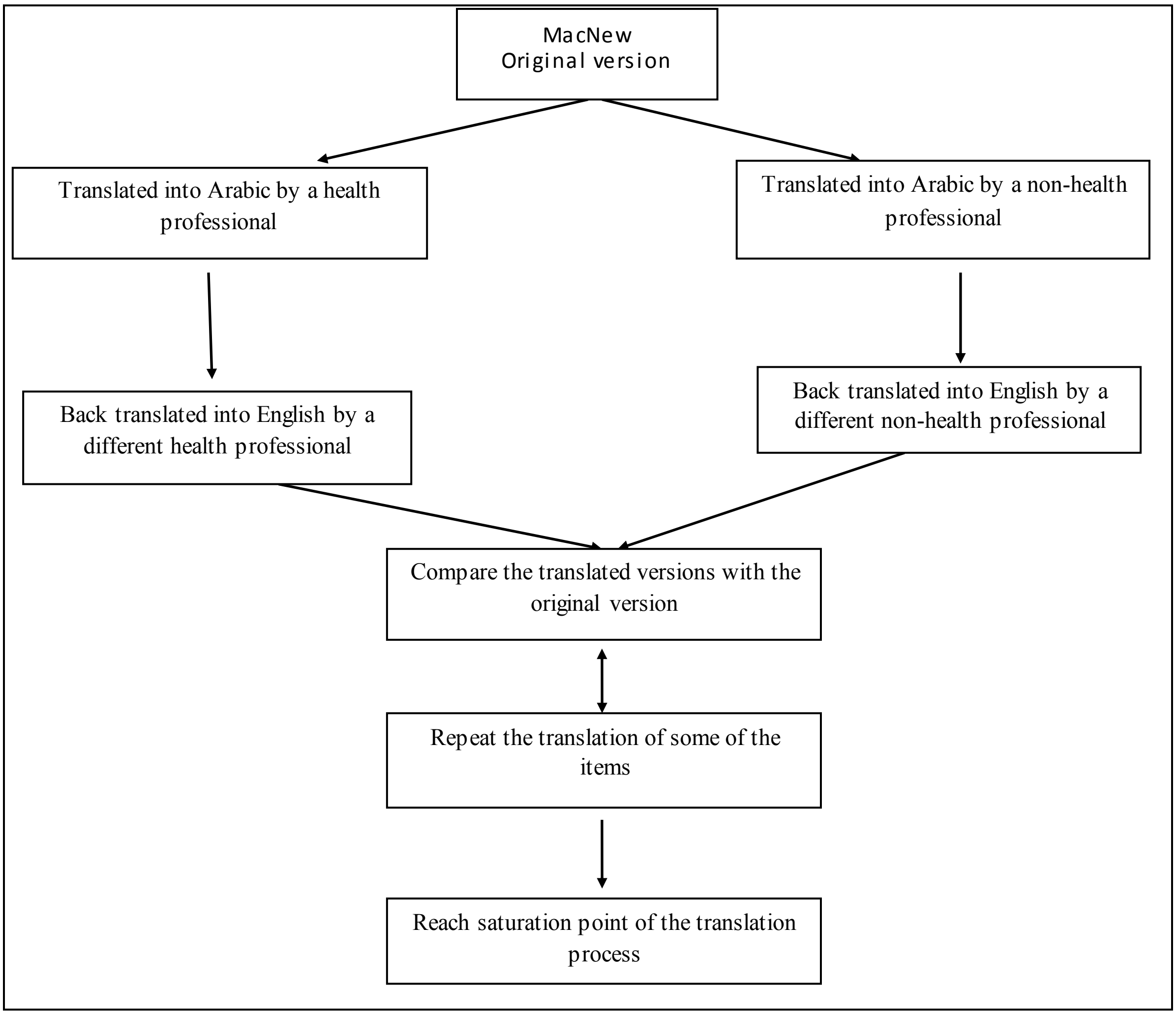

Figure 3.2. Translation process of the MacNew instrument

Reliability

The reliability of an instrument can be defined as the ability to obtain consistent results which are free from random error (SACMOT, 2002). In other words, high reliability means low amounts of error and low reliability means large amounts of error at some stage around the score (Raykov & Marcoulides, 2011). However, the errors that result due to the nature of the phenomena or the effect of an event on the phenomena, such as intervention are not considered as errors in measures (Raykov & Marcoulides, 2011). Assessment of reliability in Phase One included examination for internal consistency reliability and reproducibility.

Internal consistency:

The internal consistency of an instrument is the stability of one item's scores across other items based on the inter-correlation between items (SACMOT, 2002). This means that an instrument is internally consistent if its items are highly correlated. The internal consistency of the MacNew instrument was assessed in Phase One through Cronbach's alpha (α). The Cronbach's alpha is "an estimate of the correlation between two random samples of items from a universe of items like those in the test" (Cronbach, 1951, p.297). The estimation of reliability of the instrument is different according to the test employed. For example, for an instrument that is used in making decisions about individuals, reliability is expected to be high with a minimum of .90 for individual measurements over time. For tests that will not be used in making decisions about people, the expected reliability is .70 for group comparison (Cronbach, 1951). The reliability of the Arabic MacNew was considered adequate if it achieved a value of > .70 (SACMOT, 2002).

Reproducibility:

Reproducibility assesses the stability of a scale over time. This means that the same test is re-examined on the same persons on different occasions and then the correlation between the scores at both times will be calculated to ensure that the same construct of the MacNew instrument is measured in the same way both times. If the scores are the same at both times for the same person, then the correlation is 1.0 and the scale is perfectly stable. The intra-class correlation coefficient (ICC) which gives the error and systematic differences was used in Phase One to assess the test-retest reliability. The value for group comparisons over time should be .70 and for individual measures .90 to .95 (SACMOT, 2002).

The time interval between the test and re-test differs from one study to another. Some studies suggest that the interval between the original test and the re-test should be after a few hours and no longer than 6 months (DeVon et al., 2007). However, Waltz, Strickland, and Lenz (2010) believe that from 2 weeks to 1 month is an acceptable time interval. According to Coaley (2009), the reliability of an instrument tends to decrease over time and an interval of a few days to weeks achieves higher reliability. The interval is determined such that patients do not remember their responses from the original test but that it is not too long, as this can lead to other confounding effects associated with changes over time. Decisions about the timing of test-retest are thus influenced by the nature of the questions, and the potential for any confounding or intervening events to influence responses. In this study, the time interval between the test and retest was two weeks, as this is consistent with recommendations in the literature.

Validity

The validity of the instrument refers to "the degree to which the instrument measures what it purports to measure" (SACMOT, 2002, p. 196). Assessment of the validity of an instrument is considered in three parts: content, construct, and criterion validity. Content and criterion validity were tested in this phase. Construct validity was evaluated in Phase Two where a larger sample size was available.

Content validity:

Content validity is defined as the evidence which supports that the content of the instrument's domains are appropriate for its intended use. This was achieved in the early stage of the instrument's development where the dimensions are constructed based on searching the literature, expert opinion and trial testing. Evaluating content validity can be achieved by judgements from an expert panel that the instrument domains are clear and comprehensive. In addition, although the content validity of the MacNew questionnaire was demonstrated by the developers of the original instrument, this study assessed the content validity with experts in the cardiac disease field. Panel members were given opened-ended questions with regard to the applicability of the content, the clarity and comprehensiveness of the instrument. The panels members were also asked if the questionnaire was clear, easy to understand and easy to answer and to make general comments on the instruments and provide further suggestions to improve the instruments. The expert panel comprised five members including three members with expertise in heart disease in Saudi Arabia. The expert panel included the student's two research supervisors, the Saudi external supervisor, and two Saudi cardiology consultants.

Criterion validity:

Criterion validity generally refers to the correlation and relationship between the instrument's scale and other instrument scales which have the same functionality and are considered as a criterion measure (SACMOT, 2002). Criterion validity was assessed in this study by examining the association between two scales, the MacNew and the Short Form SF-36. A Pearson correlation coefficient calculated to determine the correlation between scores on these scales (< 0.10 = absent, 0.10–0.29 = weak, 0.30–0.49 = moderate, and ≥ 0.50 = strong) (Cohen, 1988; Steiger, 1980). *A priori*, it is hypothesised that there is a strong correlation ≥ 0.50 between similar MacNew and SF-36 constructs (MacNew physical and SF-36 physical function; MacNew social and SF-36 social function) and a lower correlation between dissimilar constructs (Cohen, 1988; Steiger, 1980).

5. SF-36

The Short Form SF-36 (SF-36) health survey was used along with the MacNew questionnaire for Phase One to evaluate the criterion validity of MacNew. The SF-36 was chosen because it has been widely used for evaluating quality of life (see Appendix G, p. 307) (Ware et al., 2008). It has demonstrated validity and reliability, and there is a version which has been validated in the Arabic population (Ware et al., 2008). Permission to use the SF-36 questionnaire was obtained from the designers of the questionnaire (see Appendix H, p. 313)

The SF-36 is an international generic questionnaire that assesses health status. It is a self-administered questionnaire which takes 15 minutes to be completed (Ware et al., 2008). It includes eight domains and two component summary measures: physical functioning (PF) (10 items); role-physical (RP) (4 items); bodily pain (BP) (2 items); general health (GH) (5 items); vitality (VT) (4 items); social functioning (SF) (2 items); role-emotional (RE) (3 items); and mental health (MH) (5 items). The two component summary measures are physical and mental. These scales provide a total measure of the respective health domains (Ware et al., 2008).

The physical function (PF) aspect assesses physical activities and the patients' limitations in doing these. It consists of a 10 item scale with three response options. Lower scores reflect significant limitations and the higher scores reflect no limitation. Role-physical (RP) assesses the physical health related role limitation. Bodily pain (BP) consists of a two item scale which reflects the intensity of bodily pain and whether this pain prevents patients from undertaking normal work (Ware et al., 2008).

The general health (GH) scale reflects the general health of patients and their views of their health. The general health scale has ratings from excellent to poor, with the low scores indicating poor health and high scores indicating excellent health. Vitality (VT) in the SF-36 instrument measures the energy levels and fatigue of patients. The social functioning (SF) domain evaluates patients' quality of health related to social activities (Ware et al., 2008).

The role-emotional (RE) domain assesses mental health related role limitations. The mental health (MH) scale evaluates four mental health dimensions: anxiety, depression, loss of behavioural/ emotional control, and psychological well-being. The health transition (HT) scale reflects changes in patients' lives during the last year (Ware et al., 2008). However, this domain is not used to score quality of life. It is used to gain information on changes to the patient's health status.

3.2.7 Data Analysis

Data collected from this part of study were analysed using the Statistical Package for the Social Sciences (SPSS) version 18.0.1 (Table 3.1). Data cleaning then followed to identify invalid codes or restriction of range or high skew on some values. The data were double-entered for verification by the researcher and then a random selection checked again by one of the supervisory team. Finally, descriptive checks were run using SPSS to identify uncompliant or illegal data.

3.2.8 Procedure and Timeline

The researcher obtained approval from the target hospital and Queensland University of Technology to recruit patients from a clinic in a cardiac ward in the King Fahd Hospital. The researcher visited the cardiac clinics each morning and the external supervisor identified patients who had appointments with her on that day and highlighted the patients eligible for recruitment into the research. The study was explained to the nurse in the clinic who gave eligible patients a participant information sheet. The researcher approached the participants after they were given time to read the participant information sheet. The eligible patients were recruited individually and asked to consent to participate in the research study. The researcher was available to participants to answer any questions related to the research. Participation was voluntary. Questionnaires were distributed and completed in the cardiac clinic while patients were waiting for their appointments.

For Phase One, 60 patients who were visiting the clinic for their first appointment after discharge agreed to participate and were recruited. Two HRQL questionnaires (MacNew and SF-36) along with the PREMISE questionnaire were used. The data from questionnaires were used as baseline data. The researcher also audited each patient's file to test the suitability of the audit tool. These data collection instruments were revised based on feedback provided by an expert panel of researchers (research supervisors and two Saudi cardiology consultants). During Phase One the researcher also interviewed patients to gain any additional data to further enhance an understanding of the secondary prevention care that the patients had received from the Saudi Arabian health services. After two weeks the researcher contacted the 60 patients via telephone, using phone numbers provided, to allow retest of the main research questionnaire (MacNew).

The period between test and retest of the MacNew questionnaires was two weeks. A total of 58 patients responded to the second questionnaire. The process for recruitment of the 60 patients took six weeks (July–Sep, 2012). The validity of the MacNew questionnaire was tested to confirm it was ready for use in phase two. Any significant error was considered before the instrument was used in phase two. The audit and interview questions were also refined if feedback indicated that this would enhance the data collection potential of the tool.

Table 3.1

Phase One Data Analysis

Research Questions	Method of Analysis	Reasons
Q1: Is the WHO-PREMISE questionnaire a valid and reliable instrument?		
(Validity of the PREMISE) **1. Content Validity**	Judgment from the research supervisors and two cardiology consultants in Saudi Arabia	To assess the clarity and comprehensiveness of the instrument, the questionnaire was given to experts and they were asked whether the PREMISE was clear, easy to understand, easy to answer, an appropriate length, adopted to the context and had clear instructions.
Q2: Is the case note audit a valid and feasible?		
(Validity of the audit) **1. Content Validity**	Judgment from the research supervisors and two cardiology consultants in Saudi Arabia	To assess the comprehensiveness of the audit and if the data were sufficient to assess the level of secondary prevention services available.
2. Feasibility	Pilot Testing of the audit tool criteria	To test if the audit was feasible in a Saudi context for assessing secondary prevention practices provided in Saudi Arabian health services.
Q3: Is the structured interview valid and feasible?		
(Validity of the interview) **1. Content Validity**	Judgment from the research supervisors and two Saudi cardiology consultants.	To assess the comprehensiveness of the questions and if the data necessary to assess the level of secondary prevention services were available.

Research Questions	**Method of Analysis**	**Reasons**
2. Feasibility	Pilot Testing of the audit tool criteria.	To test if the interview questions were feasible in a Saudi context for assessing secondary prevention practices provided in Saudi Arabian health services.
Q4: Is the MacNew questionnaire a valid and reliable health-related quality of life instrument?	Descriptive analysis (frequencies, mean and standard deviation).	-Summarise characteristics of the sample as well as scores on the MacNew scale. -The mean of each item will identify the extent to which the sample agrees or disagrees with the item scale. -The standard deviation will provide an indication of the variation in responses amongst the sample. -Parametric statistical tests were used for normally distributed data and non-parametric tests were used for data was not normally distributed with a significance level of .05 was used.
Reliability of the MacNew) **1.** Internal Consistency	Cronbach's alpha	-To test the stability of one item's scores in the MacNew across other items, as high correlations.
	Inter-Item Correlation	-The correlation between each item and the total scores from the questionnaire indicated consistency between the item and the overall construct being measured.
2. Reproducibility	Intra-Class Correlation Coefficient (ICC)	-To test the correlation between the scores at both times, to ensure the construct was stable and measuring the same construct at different times.
(Validity of the MacNew): **1.** Content Validity	Judgments from research supervisors and expert cardiology consultants in Saudi Arabia	-To assess the clarity and comprehensiveness of the instrument, the questionnaire was given to the research supervisors and two cardiology consultants who were asked whether the MacNew was clear, easy to understand, easy to answer, an appropriate length, adapted to the context appropriately, and had clear instructions.

Research Questions	Method of Analysis	Reasons
2. Criterion Validity	A Pearson Correlation Coefficient (the MacNew against the SF-36 component Scores.	-To determine the correlation between two instruments scores, as it was hypothesised there was a strong correlation between the MacNew and SF-36 constructs (MacNew physical and SF-36 physical function and so on).

3.3 PHASE TWO: PATIENT SURVEY AND AUDIT RECORDS

3.3.1 Phase Two Aims and Questions

The overall aim of Phase Two was to examine the health-related behaviours for Saudi people following a recent cardiac event, and to identify the factors that influenced these behaviours.

Objectives

1. To describe patient knowledge, attitudes and behaviours relating to participation in secondary prevention practices, using the WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** questionnaire.
2. To describe the current practices in Saudi Arabian health services for patients following a recent cardiac event within the previous three to six months as documented in their medical records.
3. Examine the influence of factors at the interpersonal, community and public policy levels on health-related behaviours.
4. To describe the health related quality of life of patients in Saudi Arabia who have had a recent cardiac event, using the MacNew Heart Disease Health-related Quality of Life questionnaire.

Questions

1. What are the socio-demographic characteristics of patients, patients' knowledge, attitudes and behaviours toward participation in secondary prevention practices in this population?

2. What are the health care practices that are provided for cardiac patients in Saudi Arabian health services (in hospital as inpatient, in the follow-up period as outpatient and in the ongoing prevention) following a recent cardiac event?

3. What are the other factors at the interpersonal, community, and public policy levels that influence health-related behaviours of Saudi Arabian cardiac patients?

4. What is the self-reported health-related quality of life for Saudi patients after a recent cardiac event?

3.3.2 Research Design

An exploratory-descriptive approach was conducted in this phase. An exploratory study is used when a researcher is interested in a particular population or experience. According to Polit and Beck (2004) the purpose of exploratory research is to look for new knowledge, meaning or insights of study which have not been studied before. In addition, an exploratory study increases the researcher's understanding of how people make sense of their lives through resolving their challenges. Exploratory research helps to explore and investigate the full nature of the phenomenon of interest (Polit & Beck, 2004).

Descriptive research aims to describe, observe, and document the situation under study (Polit & Beck, 2010). In addition, it presents the differences and similarities of participants in relation to a specific topic. Descriptive research is used when there is little or no literature to describe the population who are under study (Polit & Beck, 2010). There are two types of descriptive research: the first is a population survey or demography, which is used to describe the incidence or prevalence of a particular characteristic of a population (Brink & Wood, 1998). The second type is a complete description of one variable or concept of a particular population (Brink & Wood, 1998). Moreover, a descriptive design usually uses both qualitative and quantitative data collection methods to ensure that the description is valid. Many previous nursing research studies have used the exploratory-descriptive designs (Al-Jauissy, Al-Hassan & Akhu-Zaheya, 2009; Armstrong-Esther, Hagen, Smith & Snelgrove, 2008; Day, McCarthy & Coffey, 2009; Donohue, 2003; Elsom, Happell & Manias, 2009; Kaasalainen et al., 2010). Thus, this research used a descriptive design to describe patient characteristics, including age, health status and health-related quality of life of patients following a recent cardiac event. Descriptive design was also used to describe patient knowledge, attitudes and behaviour towards participation in secondary prevention programs in the Saudi Arabia. Finally, it described the documented practices in Saudi Arabian health services for patients in the previous three to six months following a recent cardiac event.

3.3.3 Research Setting

Data for this phase were collected from the same government hospital as in Phase One. For more detail please refer to section 3.2.3.

3.3.4 Research Participants

The research participants met the same eligibility criteria as in Phase One. Please refer to section 3.2.4.

3.3.5 Sample Size

There are a wide range of recommendations regarding sample size for factor analysis. The most common rule of thumb is a subject-to-variables ratio of 5 to 10 times the number of variables (Weis & Schank, 2000). Cattell (1978) recommended that *N* should range for 3 to 6 participants per items with a minimum of 250 participants. Gorsuch (1983) believed that 5 is the minimum ratio with a minimum of 100 participants. In addition, Comrey and Lee (1992) provided a rating scale for adequate sample size as: 100 = poor, 200 = fair, 300 = good, 500 = very good, 1,000 or more = excellent. In a more recent survey about sample size in factor analysis, Costello and Osborne (2005) found that the majority of the research used a small sample size in their factor analysis. A total of 62.9% of studies reported factor analyses based on subject to item ratios of 10:1 or less, and one-sixth reported with subject to item ratios of 2:1 or less. Hence, there are no strict rules regarding sample size for factor analysis. The sample size for assessing the construct validity of the MacNew instrument through factor analysis in this study was based on subject to item ratios of 10:1. There are 27 items in the instrument; each item was tested on 10 patients which meant that 270 patients were required overall. Thus, the sample size was 10 x 27 items = 270 patients. Approximately 300 patients were recruited to participate in this research over a four-month period (December, 2012–March, 2013). The researcher recruited five patients daily and questionnaires and case-notes were collected for each of these patients on the same day. The total number of participants was expected to be between 20 and 25 patients per week.

3.3.6 Data Collection Instrument

1. WHO-PREMISE Questionnaire

The WHO-PREMISE **P**revention of **RE**currences of **M**yocardial **I**nfarction and **S**trok**E** Questionnaire was used in this phase to describe the Saudi patients' knowledge, attitudes and behaviour towards participation in secondary prevention programs. For more detail refer to section 3.2.6.

2. Record Audits

This part of the study was designed to assess the secondary prevention programs through the assessment of the documented practices in Saudi Arabian health services for patients following a recent cardiac event within the previous three to six months. For more detail about the records audit please refer to section 3.2.6.

3. Structured Interview

The structured interview was designed to gain additional data to further enhance an understanding of the secondary prevention practices that patients received in Saudi Arabian health services through patient interview. For more detail refer to section 3.2.6.

4. MacNew Questionnaire

The MacNew Heart Disease Health-related Quality of Life instrument was administered to measure the perceived effect of a cardiac event on the quality of life of Saudi Arabian patients' daily physical activities, emotional and social functioning. For more detail refer to section 3.2.6.

Construct validity of MacNew:

Construct validity refers to the ability of the instrument to measure the construct that it is intended to measure. For the MacNew questionnaire to have construct validity, all items in the instrument should have the capability to measure the concepts of health-related quality of life. The construct validity of the MacNew questionnaire was tested using principal component analysis. Principal Component Analysis (PCA) is a data reduction technique which helps to reduce or summarise data into a smaller set of factors, and to extract the most important information from the data. Principal component analysis was chosen to test the best allocation of the items in the Arabic

MacNew questionnaire to each of the original domains (physical, emotional and social) in the original English version (Valenti et al., 1996). Other studies that have tested the psychometric properties of the MacNew (De Gucht et al., 2004; Höfer et al., 2005; Yu et al., 2008) have also used the same kind of exploratory factor analysis. Therefore, principal component analysis with varimax rotation using factor loadings of ≥ 0.40 to allocate items to an Arabic MacNew scale was conducted in Phase Two to test the hypothesis that the scale has three constructs (physical, emotional and social) (Valenti et al., 1996). As a large sample size is required for this type of analysis, this type of validity testing was conducted in Phase Two.

3.3.7 Data Analysis

Survey data from this part of the study were analysed using the Statistical Package for the Social Sciences (SPSS) version 18.0.1 (Table 3.2). Open questions in the structured interview were analysed using content analysis. These questions were analysed to present the percentages of each answer. Data cleaning processes were followed as for Phase One (Section 3.2.7)

Table 3.2

Phase Two data Analysis

Research Questions (Variables)	Type of Variable	Method of analysis	Reasons
Q1: What are the patient characteristics, patients' knowledge, attitudes and behaviour towards participation in secondary prevention programs?			
1. (Demographic data):		Preliminary analysis	To ensure no violation of the assumption of normality, linearity and homoscedasticity.
-Age -Gender -BMI -Marital Status -Education -Smoking Status -Cardiac Event	Continuous Dichotomous Continuous Nominal Ordinal Ordinal Nominal	Average (Mean), Mode, Frequency, distribution, range, percentage.	To describe patient clinical and socio-demographic characteristics.

Research Questions (Variables)	Type of Variable	Method of analysis	Reasons
-Awareness of pharmacological agent. -awareness of healthy lifestyle. -awareness of dietary factors -awareness of physical activities factors -awareness of CVD risk factors.	Dichotomous/ Nominal	Descriptive analysis. Frequency distribution, percentage, range (mode).	To describe patient clinical and socio-demographic characteristics, the mean of each item will identify the extent to which a person agrees or disagrees with item. The standard deviation will provide an indication of the variation in responses amongst the sample.

Research Questions (Variables)	Type of Variable	Method of analysis	Reasons
Q2: What are the secondary prevention practices that are provided for cardiac patient?			
(Inpatient Data) -medical history -physical history -clinical examination -identify risk factors. support/counselling -mobilising program -discharge plan	Nominal Continuous Dichotomous	Mode, frequency, distribution, range, percentages.	To analyse the elements and each element of practice.
(Outpatient Data) -physical activity -education, discussion and counselling -referral plan	Dichotomous	Mode, frequency, distribution, range, percentages.	To analyse the elements and each element of practice.
(ongoing prevention) -behaviour change -goals of medical therapy	Dichotomous	Mode, frequency, distribution, range, percentages.	To analyse the elements and each element of prac

Research Questions (Variables)	Type of Variable	Method of analysis	Reasons
Q3: What is self-report quality of life?			
1. Construct Validity of the MacNew		Kaiser's Test Principal Component Analysis with Varimax Rotation.	To determine if the data are suitable for factor analysis. To evaluate the internal structure of the MacNew scale and subscales, Varimax rotation method process will identify which variables are grouped together to propose possible interpretations. This approach will allow for maximising the dispersion of loadings within factors.
Health-related Quality of Life (HRQL)	Continuous	Descriptive analysis (frequencies, range, medians and percentages).	To analyse the demographic element and each element of practice.
.		Scoring System.	The score of each domain is calculated by adding up the responses for each item and then calculating the average of the number of the responses. A global score will be calculated as the average over all items. If more than 50% of the items for a domain are missing, the score will be considered as missing and will not be calculated

Research Questions (Variables)	Type of Variable	Method of analysis	Reasons
Further Analysis:			
HRQL (D) & Patient characteristics (ID).	Continuous & Nominal/ Ordinal	ANOVA	To identify the relationships between quality of life and different patient predictors (age, education, gender, income, smoking).
HRQL (D) & patient knowledge (ID)	Continuous & Categorical	t-test/ANOVA	To identify the relationships between patient quality of life and patient knowledge and attitudes towards secondary prevention programs
Patient Knowledge (ID) & patient characteristics (D)	Categorical & Categorical	Chi-square/regression analysis	To describe the relationships between patient knowledge and the different patient predictors.
Patient Knowledge (ID) & use of medication (D)	Categorical & Categorical	Chi-square/regression analysis	To identify the relationships between patient knowledge and the use of medications by CVD patient.
Patient Characteristics (ID) & HRQL (D)	Categorical & Continuous	Chi-square/ ANOVA	To identify the relationships between different patient predictors and their quality of life.
Patient Characteristics (ID) & Patient Knowledge (D)	Categorical & Categorical	Chi-square/ ANOVA	To identify the relationships between different patient characteristics and their knowledge and attitudes towards secondary prevention practices

3.3.8 Procedure and Timeline

The procedure of recruitment in this phase was the same procedure that was used in Phase One (section 3.2.7). A total of 300 patients were recruited for Phase Two over a four-month period (December, 2012–March, 2013). The MacNew questionnaire was administered to patients who provided consent to participate. After the patient completed the MacNew, the WHO-PREMISE questionnaire was distributed. The researcher audited the patient's files to complete the case-note audit, then the researcher interviewed the patient using the structured prepared questions to assess the secondary prevention practices that each patient received in the Saudi Arabian health services. After both questionnaires and the interview were completed, participants received a thank-you letter and information booklet in Arabic language translated from the Australian Heart Foundation guidelines on secondary prevention after a cardiac event. Finally, the recoded and de-identified data were uploaded into the researcher's database onsite.

3.4 ETHICAL CONSIDERATIONS

Ethical approval to conduct this study was moved through the following processes: obtaining ethical approval from the target hospital in Saudi Arabia; obtaining ethical approval from Queensland University of Technology; and obtaining the consent of the participants to be part of this study.

Firstly, ethical approval to conduct this study was obtained from King Fahd General Hospital in Saudi Arabia (see Appendix I, p. 314). Additionally, an approval letter from the cardiologist to allow for the researcher to collect the data in her clinic is also provided (see Appendix J, p. 315). After the researcher received ethical approval from the hospital in Saudi Arabia, an application for ethical approval was submitted to the Human Research Ethics Committee at QUT.

The researcher applied for low risk ethical approval form Queensland University of Technology (see Appendix K, p. 316). This project was considered low risk because the participation in the research involved no risks beyond day to day living. However, the research may have led to anxiety for participants as they reflect on potentially stressful experiences. The researcher minimised any harm by providing informed consent and offering information about referral for support if required. The participants received a thank-you letter and an information booklet about secondary prevention after a cardiac event based on the Australian Heart Foundation guidelines that were translated into Arabic language.

The researcher considered that the research is supervised by an Australian institution, and that it was conducted in another country. Because the researcher is from Saudi Arabia, she has a background understanding about the Saudi community and the hospital's policies in Saudi Arabia. The researcher has experience in dealing with Saudi patients, which made the recruitment process easier for patients.

Consent was obtained from all participants who had participated (see Appendix L, p. 318). The external supervisor identified the patients who have appointments with the cardiologist on that day and highlighted the eligible patients for recruitment in the research. The clinic nurse gave those patients participant information sheets (see Appendix M, p. 321). Potential participants were approached by the researcher after having been given time to read the participant's information sheet. The potential participants were contacted individually and provided with consent forms. The researcher explained to the participants the purpose of the study, the procedure for data collection, potential risks and benefits, time commitment, their right as participants, and the strategies to protect privacy and anonymity. The potential participants were given the written consent forms if they agreed to participate. The researcher was available to answer any questions prior to the participants signing the consent form. Participation in this study was voluntary and participants were free to withdraw at any time without penalty. Written consent from participants was gained before participation.

In order to achieve confidentiality, the names of participants were not required in any of the responses. The data were used only for research purposes, and only the researcher and her supervisors had access to the data. No names or other identifiers, such as geographic region, appeared or were presented in the data. In addition, data (hard and paper copies) were locked in a filing cabinet in the School of Nursing at QUT. The keys of the cabinet were kept with the researcher to guarantee security. Electronic data were stored in the researcher's personal computer in the School of Nursing, and controlled by a password for the personal computer. In Saudi Arabia, data (hard and paper copies) were locked in a filing cabinet in the office of an external supervisor at King Fahd General Hospital. Electronic data were stored in the researcher's personal computer controlled by a password.

3.5 CONCLUSION

Chapter 3 has presented the research design for this study, described the two phases and justified the use of a quantitative approach to address the study questions. In the following chapter, the study results for Phase One and Phase Two are described.

Chapter 4: Results and Discussion of Phase One

4.1 INTRODUCTION

The previous chapter presents the research design adopted to achieve the aim and objectives of this study. The purpose of this chapter is to present the results of Phase One of this study. Evidence of the reliability and validity of the study's instruments will be provided.

4.2 PHASE ONE RESULTS

The aim of Phase One was to verify whether the instruments used to assess health-related behaviours and quality of life of Saudi patients, following a recent cardiac event, were valid and reliable for a Saudi Arabian population following translation into Arabic. The phase also aimed to verify whether the audit tool and the structured interview were suitable for use in a Saudi Arabian context to assess and document health practices for patients following a recent cardiac event. The following section addresses the results from Phase One, which provided evidence of the reliability and validity of the WHO-PREMISE and MacNew questionnaires, and provided evidence of the validity and feasibility of records audits and structured interview instruments.

4.2.1 Patient Characteristics

A total of 60 eligible participants were recruited into Phase One. Of the 60 participants, 61.7% (37) were male. Mean age of participants was 53.80 years (SD =13.2, 16 –78). Of the 60 participants, 41.7% were currently smokers, 11.7% had given up, 26.7% never smoked, and for 20% smoking status was unknown or undocumented. All participants had one or more cardiac events including MI (46.7%), angina (43.3%) and other events (10%) (Table 4.1).

Table 4.1

Baseline Sociodemographic and Clinical Characteristics (n = 60)

Patient Characteristics	**Mean ± SD**	**% (*N*)**
Age (years)	53.8 ± 13.3	
Gender		
Male		61.7 (37)
Female		38.3 (23)
Marital Status		
Single		5 (3)
Married		90 (54)
Divorced		5 (3)
Education		
No formal education		13.3 (8)
Primary education		8.3 (5)
Secondary education		8.3 (5)
High/technical education		3.3 (2)
University/college education		13.3 (8)
Undocumented		53.3 (32)
Smoking Status		
Current		41.7 (25)
Given up		11.7 (7)
Never smoked		26.7 (16)
Unknown/undocumented		20 (12)
Diagnosis		
IHD		58.3 (35)
ACS		31.7 (19)
Mitral stenosis		10 (6)
Cardiac event		
MI		46.7 (28)
Angina		43.3 (26)
MVR		10 (6)

The demographic characteristics of the sample reflect a population who had a number of risk factors for CVD, such as increased age and male gender. Importantly, the results also indicated that there is a high prevalence of tobacco use among the participants, which is considered a major contributor to CVD development, causing nearly 10% of CVD. These findings are concerning when compared with international data. According to the WHO (2011) the highest prevalence for smoking is 31% and this in the European Region, compared with 41.7% in this study. Interestingly, the prevalence of tobacco consumption in this study is substantially higher than that reported by Siddiqui et al. (2001) (34.9%), which was considered the highest prevalence of tobacco use among the Saudi population.

4.2.2 WHO-PREMISE Questionnaire

The Prevention of Recurrences of Myocardial Infarction and StrokE (WHO-PREMISE) questionnaire was used in low and middle income countries to determine the extent of secondary prevention of coronary heart disease and cerebrovascular disease. While the original version of WHO-PREMISE was developed by the World Health Organisation and used in different countries including Arabic countries, it had not been translated into Arabic language. Phase One of the study therefore tested the validity of this questionnaire after it was translated into Arabic language.

1. **Validity**

1.1 Content validity

The content validity of the WHO-PREMISE questionnaire was also confirmed through the assessment by the same two researcher supervisors and the experts in the area of cardiac disease for Saudi Arabia along with other instruments. The experts reported that the questionnaire was clear, had appropriate length, and adapted to the

Saudi context appropriately. However, there are some issues noted after the pilot test of this questionnaire with Saudi patients.

Issues:

In general, respondents were not comfortable with the format of this instrument. They described the format as very difficult to understand and thus they had many questions regarding the questionnaire. In addition, the questions about the name of the medications were very ambiguous as the scientific names of the medications are used to identify these medications and therefore, almost all participants did not know the scientific names and left those questions unanswered.

Modifications:

In response to these issues, the interview-administered mode of application of the WHO-PREMISE questionnaire was chosen instead of a self-report. This is the same approach used by the World Health Organisation project. Moreover, during the interview, patients were asked about the names of medications by using the general or descriptive names. For example, the question "Did your doctor ask you to use a Statin?" was modified to "Did your doctor ask you to use cholesterol lowering medication?". Finally, this instrument was kept in English language as the researcher needed to read and understand the scientific and medical terminology contained in it. The researcher then asked the participants the questions in an Arabic language. Therefore, the results of this study confirmed the reliability and content validity of this instrument with modifications as detailed. Moreover, the results of this study confirmed that the WHO-PREMISE questionnaire is likely to be more successful if it is employed as an interview method rather than as a self-report.

4.2.3 Record Audits

1. **Validity**

1.1 Content Validity

Expert review of the instrument revealed that the instrument adequately covered the necessary data for assessing practices in Saudi Arabian health services in a clear format and was easy to access.

2. **Feasibility**

However, the pilot testing of this instrument indicated that there are some issues with using this instrument as follows:

Issues:

This instrument contains questions about the marital status and the education level of patients, which is important information but the answers were not always available in patient records. Additionally, there were insufficient criteria in the audit tool to cover the assessment of the clinical examination of Saudi cardiac patients following a recent cardiac event during hospitalisation. Moreover, in Saudi Arabia not all clinical assessment screening procedures are available for cardiac patients. The routine procedures available are echocardiogram, electrocardiogram (ECG), and chest X-ray. There were no results for the chest X-ray and ECG available because doctors just report these and no formal record exists in the chart.

Modifications:

After the pilot testing of this instrument, all questions regarding demographic data including the marital status and education levels were moved to the WHO-PREMISE instrument which were then used as interview questions and the researcher asked the patients these questions. Moreover, the assessment of the clinical examination expanded from the international guideline for secondary prevention practices. For example, the assessment of the transoesophageal echocardiogram (TOE), chest X-ray, radionuclide scan, coronary angiography, and echocardiogram have been added to the audit as this is consistent with international guidelines. Furthermore, the structured interview instrument was used after auditing records to provide additional data for assessing secondary prevention practices that may have been missed in the audit records. Thus, the results of this study confirmed the content validity of this instrument and the feasibility with modifications as detailed.

4.2.4 Structured Interview

Evaluation of the content validity and feasibility of this instrument ensured that this instrument was likely to be valid and feasible to add more data for assessing the secondary prevention practices in Saudi Arabian health services. The experts in Phase One reported that this instrument adequately and comprehensively covered the criteria for assessing the secondary prevention practices in the Saudi context. Importantly, the findings of Phase One suggested adding open questions following each scale in the structured interview to allow for participants to provide additional data about their experience. The results of this study therefore provided strong evidence of the content validity and feasibility of this instrument. Subsequently, this instrument was used in Phase Two with open questions added following each scale to explore additional issues for patients.

4.2.5 MacNew Questionnaire

The Saudi MacNew was completed by the participants in less than 15 minutes. The missing item rate was 71.7% for item 27 (sexual intercourse) and 0% for all other items (Table 4.2).

1. Reliability

The reliability of the MacNew was evaluated by examining its internal consistency (Cronbach's alpha); test-retest reliability (2 weeks) was assessed with intra-class correlation coefficient (ICC).

Table 4.2

MacNew Heart Disease Health-Related Quality of Life Item Characteristics (n = 60)

Item	Missing (%)	Mean	Standard deviation
Emotional Scale			
1. Frustrated	0	4.2	1.4
2. Worthless	0	4.4	1.4
3. Confident	0	4.1	1.4
4. Down in the dumps	0	4.3	1.4
5. Relaxed	0	4.2	1.2
6. Worn Out	0	4.0	1.5
7. Happy with Personal Life	0	4.4	1.1
8. Restless	0	4.4	1.5
10. Tearful	0	4.6	1.5
12. Social Activities	0	4.2	1.4
13. Other/less Confidence in you	0	4.8	1.4
15. Lack Self-Confidence	0	4.6	1.4
18. Frightened	0	4.4	1.6
23. Burden on Others	0	4.6	1.6
Physical scale			
6. Worn Out	0	4.0	1.5
9. Short of Breath	0	4.5	1.6
12. Social Activities	0	4.2	1.4
14. Chest Pain	0	4.5	1.5
16. Aching Legs	0	4.6	1.8
17. Sports/Exercise Limited	0	4.1	1.6
19. Dizzy/Lightheaded	0	4.8	1.6
20. Restricted or Limited	0	4.1	1.5
21. Unsure about Exercise	0	4.0	1.5
24. Excluded	0	4.0	1.4
25. Unable to Socialise	0	4.3	1.4
26. Physically Restricted	0	4.1	1.5
27. Sexual Intercourse	71.7	4.0	1.6
Social scale			
1. Worthless	0	4.2	1.4
11. More Dependent	0	4.5	1.6
12. Social Activities	0	4.2	1.4
13. Other/less Confidence in you	0	4.8	1.4
15. Lack Self-Confidence	0	4.6	1.4
16. Sports/Exercise Limited	0	4.6	1.8
20. Restricted or Limited	0	4.1	1.5
21. Unsure about Exercise	0	4.0	1.5
22. Overprotective Family	0	4.3	1.5
23. Burden on Others	0	4.6	1.6
24. Excluded	0	4.0	1.4
25. Unable to Socialise	0	4.3	1.4
26. Physically Restricted	0	4.1	1.5

1.1 Internal Consistency

The MacNew Global score and subscales demonstrated good internal consistency reliability, with Cronbach's α exceeding .96 and good reproducibility and test-retest correlation coefficients (Table 4.3).

Table 4.3

MacNew Global and Subscale for 26 Items: Internal Consistency (Cronbach's Alpha; Intraclass Correlation Coeficient (n = 60); and Test-Retest Reliability (n = 58)

	% Missing	Mean score at Baseline (SD)	Mean score at retest (SD)	Baseline Cronbach's alpha	Baseline intra-class correlation	Test-retest correlation
Global	0	4.39 (1.2)	4.29 (1.3)	.95	.95	.87
Physical	0	4.31 (1.3)	4.25 (1.4)	.93	.93	.84
Emotional	0	4.41 (1.2)	4.31 (1.4)	.93	.92	.81
Social	0	4.36 (1.3)	4.28 (1.4)	.91	.91	.83

2. Validity

2.1 Content Validity

The MacNew demonstrated content validity among Saudi patients with MI, angina and MVR. The MacNew scale was assessed by the research supervisors and the experts in the area of cardiac disease for Saudi Arabia.

In addition, although most of the patients left the last question "How often during the last 2 weeks have you felt your heart problem limited or interfered with sexual intercourse?" without answer, they responded to all other questions.

2.2 Criterion Validity

Criterion validity was strongly confirmed. All correlations were statistically significant and ranged from 0.41 to 0.70 (Table 4.4). The MacNew Global score and each subscale and both SF-36 summary components scores were consistently correlated ≥ 0.50. On the other hand, the correlations were ≤ 0.50 between dissimilar constructions.

Table 4.4

Correlation of SF-36 and MacNew Scale Scores (n = 60)

SF-36 Subscales	MacNew Subscales			
	Global	Emotional	Physical	Social
Physical Functioning	.54	.47	.60	.54
Role-Physical	.67	.63	.69	.67
Bodily Pain	.68	.64	.70	.65
General Health	.65	.67	.59	.60
Vitality	.67	.67	.64	.62
Social Functioning	.65	.67	.59	.63
Role-Emotional	.62	.60	.60	.60
Mental Health	.53	.62	.41	.46
Physical Component Summary	.63	.55	.70	.64
Mental Component Summary	.60	.66	.49	.54

* All correlations of SF-36 and MacNew scale scores were statistically significant

The results of this study indicate that the Arabic version of the MacNew Heart Disease Health-related Quality of Life questionnaire meets the selected psychometric standards recommended by the Medical Outcomes trust Scientific Advisory Committee in Saudi patients with cardiac events (MI, angina, mitral valve regurgitation). The findings of this study provide strong evidence of the relevance of the MacNew items to the patients. The response rate of the MacNew items was high (100%) for all items except sexual activity, which had the lower response rate (28.9%) and this evidence was further supported by the time needed to complete the instrument (approximately less than 15 minutes). Although the questionnaire obtains self-report data and the researcher did not ask the participants this question directly, the majority of the participants left item 27 (sexual activity) unanswered. This result was not substantially different from other language versions of the MacNew (Höfer et al., 2004; Daskapan et al., 2007), the sexual activity item had a lowest response rate in Arabic language which may be explained by cultural specificities. In fact, the discussion regarding the sexual issues and sexual health are considered to be sensitive topics in Saudi Arabia. Health care professionals typically respect the cultural norms of patient and may not raise these issues for discussion (Alzahrani, 2011). Therefore, this item was omitted from the instrument for Phase Two with permission from the questionnaire designers. However, no significant differences were detected in this study between the score of quality of life at baseline and in a follow-up clinic in 2 weeks later. As this study was cross-sectional and there was no intervention, the stability of patients' quality of life over time is expected.

In the present study, evidence of reliability and validity for the Arabic version of the MacNew questionnaire has been confirmed. The Arabic version of the MacNew questionnaire has excellent internal consistency reliability with a Cronbach's alpha value ≥ .91 for each domain of the MacNew and the Global score. In fact, the internal consistency in this study exceeds the recommended criteria of .70 for group comparison on all MacNew scales and is very close to or exceeds the criteria of .90 for individual comparison. This result is consistent with previous findings for the MacNew questionnaire in different countries and other languages (Daskapan et al., 2008; Hiller et al., 2010; Höfer et al., 2005; Höfer et al., 2004; Höfer et al., 2008; Leal et al., 2005; Maes et al., 2008; Nakajima et al., 2009; Yu et al., 2008). The finding of this study also indicate that the reproducibility of the MacNew questionnaire over 2 weeks follow-up was confirmed, also consistent with MacNew reports in other languages (Höfer et al., 2008; Leal et al., 2005; Maes et al., 2008; Yu et al., 2008). Finally, the test-retest reliability of the MacNew was assessed in 58 patients with significant correlations for the MacNew scales ranging from 0.81 to 0.87 for each MacNew scale. Therefore, the Arabic version for the MacNew questionnaire has demonstrated a good reliability of all MacNew scale items.

In the present study, the content and criterion validity was confirmed. Expert review of the instrument's content ensured that the instrument adapted to the Saudi context appropriately, has appropriate length, and is in a clear format. The criterion validity hypothesis for the MacNew was confirmed with correlation ranged from 0.41 to 0.70. Moreover, the correlation was ≥ 0.50 between the physical MacNew and SF-36 PCS scales and between the MacNew emotional and SF-36 MCS scales. Furthermore, as hypothesised, there are lower correlations between dissimilar scales which were significantly lower than the correlations between similar scales in the two instruments.

Therefore, the Arabic version of the MacNew Heart Disease Health-related Quality of Life can be recommended as a suitable instrument for assessing and evaluating HRQL in Arabic speaking patients after cardiac events, as it has demonstrated adequate psychometric properties. However, responsiveness to change needs to be further investigated in a longitudinal study, for example, following cardiac catheterisation, and cardiac rehabilitation.

Overall, results from Phase One of this study demonstrate the reliability and validity of the MacNew questionnaire, and confirmed that the WHO-PREMISE, record audit, and structured interview are valid and feasible with some modifications (Table 4.5). Importantly, the findings of this study make several contributions to Arabic researchers in the cardiac disease prevention field. Phase One of this study provided the Arabic version of the MacNew Heart Disease Health-related Quality of Life to assess and evaluate the quality of life of patients following a cardiac event. It also provided the record audit and structured interview instruments to evaluate the current practices in health services for cardiac patients following a recent cardiac event.

Having the reliability and validity of the instruments confirmed, Phase two of this study used the revised instruments.

4.3 CONCLUSION

Chapter 4 presented the results of Phase One of the study. An interpretation of the findings from Phase One of the study has been presented. The results of Phase Two of the study will be presented in the following chapter.

Table 4.5

Key Findings from Validity and Reliability Testing and Associated Modifications to Study Instruments

Instruments	Content validity	Feasibility	Changes
MacNew	-Clear. -Easy to understand. -Easy to answer. -Has appropriate length. -Adapted to the Saudi context appropriately. -Has clear instructions.	-The missing item rate was 71.7% for item 27 (sexual intercourse).	-Item 27 has been excluded from the questionnaire with permission from the questionnaire designers.
WHO-PREMISE	-Clear. -Easy to understand. -Easy to answer. -Has appropriate length. -Adapted to the Saudi context appropriately. -Has clear instructions.	-The format of this questionnaire was difficult for participants to understand. -The participants found the questions about medications very ambiguous.	-The questionnaire has been used as an interview format rather than self report. -The researcher asked the participants about their medication use by using generic names. -The researcher used the English version. -Some demographic data have been added to this questionnaire.
Record Audits	-The data are easy to access. -All the data that is necessary to assess practices in Saudi Arabian health services are available.	-Some of the data were not available in records e.g. marital status and patient education. -Some of data were not easy to access from records. -The assessment of the clinical examination during hospitalisation was insufficient.	-This data have been moved to the WHO-PREMISE questionnaire. -These data have been excluded and the same criteria were available in the structured interview. -The clinical examination criteria have been expanded.
Structured Interview	-The criteria are clear and comprehensive. -The data that are necessary to assess the level of secondary prevention services are available.	-an open question was needed following each scale for additional data.	-An open question has been included following scale to allow for participants to provide additional data.

Chapter 5: Results of Phase Two

5.1 INTRODUCTION

The previous chapter presented findings relating to the reliability and validity of the study's instruments. The purpose of this chapter is to present the results of Phase Two of this study which sought to provide a more detailed account of secondary prevention practices and quality of life amongst Saudi cardiac patients.

5.2 PHASE TWO RESULTS

5.2.1 Sociodemographic and Clinical Characteristics of Study Sample

A total of 300 eligible patients were recruited with 297 of these patients completing the questionnaires and interview. The remaining three patients completed less than 50% of the questionnaire items, so their data are not included in this study.

As shown in Table 5.1, the mean age of the participants was 58.06 ± 11.02 years, ranging in age from 24 to 94 years. The majority of patients were male (75.1%). Most participants were married (82.3%). One matter of concern was 158 out of 297 participants (53.8%) were currently smoking, with a further 41participants (13.9%) having smoked in the past. As shown in Table 5.6, cardiac events included MI (68.4%), angina (22.2%), mitral valve regurgitation (6.7%), and other events (2.7%).

Table 5.1

Baseline Socio-demographic and Clinical Characteristics (n = 297)

Patient Characteristics	**Mean ± SD**	**% (*N*)**
Age (Years)	58.06 ± 11.02	
Gender		
Male		75.1 (223)
Female		24.9 (74)
BMI	28.4 ± 6.25	
Marital Status		
Single		4.4 (13)
Married		82.3 (241)
Divorced		4.4 (13)
Widowed		8.9 (26)
Education		
Unable to read		26.9 (80)
No formal education		20.9 (62)
Up to primary school		22.9 (68)
Up to high school/technical education		14.8 (44)
University		14.5 (43)
Smoking Status		
Current		53.8 (162)
Given up		13.9 (41)
Never smoked		32.3 (95)
Cardiac Event		
MI		68.4 (203)
Angina		22.2 (66)
MVR		6.7 (20)
Other		2.7 (8)

5.2.2 Biochemical Risk Factors of the Participants at the Follow-up Visit

Participants were considered to have normal BP if they had a BP measurement of less than 140/90 mmHg. A total cholesterol level (TC) < 5.5mmol/L, low density lipoprotein cholesterol (LDL-C) < 1.8mmol/L, and high density lipoprotein cholesterol (HDL-C)> 1.0mmol/L was treated as normal. Further, the random plasma triglyceride level (TG) of < 2.0mmol/L was treated as normal. The glycated haemoglobin level (HbA1c) of ≤ 7% was treated as normal. Finally, a serum creatinine level (Cr) between 44–97µmol/L, Troponin between 0–1µg/L, and none of the CRP-c was treated as normal. Table 5.2 presents the percentage of participants who had biochemical measurements above normal limits. More than half of participants (67.3%) had hypercholesterolemia and just over half of the participants (52.1%) had hyperglycaemia.

Table 5.2

Biochemical Measurements of the Participants at the Follow-up Visit

Variables	*N*	Percentage
BP ≥ 140/90 mmHg	291	34.0%
Total Cholesterol ≥ 5.5mmol/L	247	67.3%
Low-Density Lipoprotein Cholesterol ≥ 1.8mmol/L	199	69.4%
High-Density Lipoprotein Cholesterol< 1.0mmol/L	251	44.4%
Triglyceride ≥ 2.0mmol/L	245	42.8%
HBA1c > 7%	167	52.1%
Creatinine > 97µmol/L	254	17.3%
Troponin Elevated Glucose > 1µg/L	72	77.8%
CRP-c Reactive protein > 0 mg/L	2	100%

5.2.3 Patient Knowledge, Attitudes and Behaviours Relating to Participation in Secondary Prevention Practices

The following section summarises the patient's knowledge, attitudes and behaviours relating to participation in secondary prevention practices following a cardiac event. This section describes patients' knowledge and attitudes towards all aspects of guidelines about secondary prevention programs, such as adherence to pharmacological agents, healthy lifestyle factors, dietary factors, tobacco use, exercise and individual knowledge of disease.

- **Awareness and Adherence to Pharmacological Agents**

As shown in Table 5.3, the majority of respondents who had a cardiac event indicated that they have been advised to take the common first line medications. For example, aspirin had been prescribed to 92.3% of participants, beta-blockers to 93.3%, ACE Inhibitors to 98.2% and Statins to 86.2%. Most participants had been taking medications as advised by their doctors. Further, for a large proportion of the participants, 255 (86.1%) at the last visit, the doctor was reported to be monitoring the patient's medication use. However, less than half of respondents were aware of how long they should continue taking medications with a small number of patients being aware of the side effects of taking medications.

Table 5.3

Adherence to Pharmacological Agents (n = 297)

Pharmacological Agents	Aspirin % (*N*)	Beta-Blockers %(*N*)	ACE Inhibitors % ()(*N*)	Statins % (*N*)
Doctor has advised patients to take those drugs	92.3 (274)	93.3 (277)	89.2 (265)	86.2 (256)
	***N* = 274** **% (*N*)**	***N* = 277** **% (*N*)**	***N* = 265** **% (*N*)**	***N* = 256** **% (*N*)**
Patients have taken those drugs	87.5 (260)	88.2 (262)	84.5 (251)	81.5 (242)
Doctors told patients how long they should take the drugs	44.8 (133)	40.7 (121)	38.9 (115)	38.4 (114)
Doctor told patients about the side effects that may results from those drugs	12.8 (38)	5.7 (17)	5.4 (16)	6.4 (19)
At last visit, doctor asked patients if they are taking their medicines regularly (n=297)	86.1 (255)			
Reasons for not taking medications as prescribed:	***N* = 14** **% (*N*)**	***N* = 15** **% (*N*)**	***N* = 14** **% (*N*)**	***N* = 15** **% (*N*)**
Cannot afford the cost	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Not easily available	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
I don't feel the need	64.3 (9)	60.0 (9)	57.1(8)	60.0 (9)
I experienced side effects	35.7 (5)	40.0 (6)	42.9 (6)	40.0 (6)

- **Awareness of Healthy Lifestyle**

As presented in Table 5.4, nearly half of the participants (49.2%) were aware of the benefit of a heart-healthy diet with a further (48.1%) of the participants being aware of the benefit of quitting smoking in reducing the risk of CVD. Furthermore, only (42.1%) of participants were aware of the benefit of engaging in regular physical activity

Table 5.4
Awareness of Health Lifestyle (n = 297)

Healthy Lifestyle Factors	Heart-Healthy Diet % (*N*)	Quit Smoking % (*N*)	Physical Activity % (*N*)
Patients know whether the following factors can be important in preventing heart attack and stroke	49.2 (146)	48.1(143)	42.1(125)
Have the patients ever been advised by doctor on the following factors	90.6 (269)	56.2 (167)	36.4 (108)
In the follow-up did the doctor/nurse ask the patient if they follow the lifestyle advice instructions on this factor	79.8 (237)	45.5 (135)	33.0 (98)

- **Awareness of Dietary Factors**

The awareness of dietary factors among Saudi cardiac patients are summarised in Table 5.5. More than a third of participants (36.0%) reported knowledge of the benefits of consuming less oily and fatty foods with a further (39.4%) of participants acknowledging that they should eat less salt in their food. Approximately a third of the participants (33.3%) had knowledge of the benefits of consuming fish, and about the same percentage (33.7%) had knowledge of the benefits of eating less red meat.

In general, just over half of the participants (53.9%) indicated that they had difficulty in following advice about healthy diets.

Table 5.5

Awareness of Dietary Factors (n = 297)

Dietary Factors	% (*N*)
Patients know that they should:	
Eat less oily and fat foods	36.0 (107)
Eat less salt in their food	39.4 (117)
Eat less meat like mutton and beef	33.7 (100)
Eat more fruit and vegetables in their daily diet	40.7 (121)
Include more fish in their diet	33.3 (99)
Patients have difficulty in following the diet as advised **(*N* = 297)**	53.9 (160)
What difficulty do patients have in the following the diet as advised (*N* = 160):	
Lack of availability	30.0 (48)
Cannot afford	91.2 (146)
Other	0.62 (2)

- **Awareness of Physical Activity Factors**

Table 5.6 displays the level of participants' awareness of physical activity factors. Responses indicated that few participants were aware of the importance of engaging in physical activities. For instance, 70.4% of the participants reported that they did not engage in at least 30 minutes of moderate physical activity a day for one or more reasons. The reasons for lack of engagement in physical activity were: 72 (34.4%) have insufficient time; 11 (5.2%) were physically disabled; 125 (59.8%) believed that the physical activity was not good for them; and 51 (24.4%) lacked facilities.

Table 5.6

Awareness of Physical Activities Factors (n = 297)

Exercise Factors	**% (*N*)**
Patients engaged in job related physical activities (e.g. house work, farming) every day	30.3 (90)
Patients engaged in at least 30 minutes of moderate physical activity daily	29.6 (88)
The reasons of being not physically active (*N* = 209):	
Insufficient time	34.4 (72)
Physical disability	05.2 (11)
Not good for me	59.8 (125)
Facilities not conductive	24.4 (51)
Other	00.5 (1)

- **Awareness of Cardiovascular Risk Factors**

The awareness of cardiovascular risk factors is set out in Table 5.7. Around half of the participants had a check-up for their blood pressure and blood glucose in the previous year, while more than a third had their blood cholesterol monitored. Further, 55.6% of participants reported having a history of hypertension, 49.8% had diabetes and 30.2% had hypercholesterolaemia. Overall, less than a third of those who responded had knowledge of cardiovascular risk factors.

Table 5.7

Awareness of Cardiovascular Risk Factors (n = 297)

Cardiovascular Risk Factors	**Blood Pressure % (*N*)**	**Blood Sugar % (*N*)**	**Cholesterol (Lipids) % (*N*)**
Have patients had the following factors checked in the last year	58.6 (173)	53.9 (159)	36.9 (109)
Patients know if they are suffering from the following factors	55.6 (164)	49.8 (147)	30.2 (89)
Patients know that if the following are well controlled, the chances of having another heart attack or stroke will be reduced	31.9 (94)	28.8 (85)	28.1 (83)

5.2.4 Documented Secondary Prevention Practices in Saudi Arabia

The following section summarises the assessment of the documented health practices relevant to secondary prevention that are provided in Saudi Arabian health services for patients following a recent cardiac event. This assessment includes the documented secondary prevention practices during hospitalisation, following discharge, and ongoing prevention practices.

- **Documented Secondary Prevention Practices During Hospitalisation:**

As presented in Table 5.8, on average, only 10 (3.4%) participants had their medical history taken in a comprehensive way. No patients indicated having a transoesophageal echocardiogram or a radionuclide scan as clinical examinations during hospitalisation. Additionally, no patients indicated measuring their physical activity for identifying CVD risk factors. No patients indicated also being offered mobilising program, and assessment of progress/or symptoms during activity.

Table 5.8

Documented Secondary Prevention Practices During Hospitalisation (n = 297)

Documented Secondary Prevention Practices	% (*N*)
Medical History:	
1. The full medical history taken:	3.4 (10)
2. Hypertension	61.6 (183)
3. Diabetes	54.9 (163)
4. CHD	57.9 (172)
5. Heart failure	0.0 (0)
6. Stroke	0.0 (0)
7. ACS (angina pectoris, MI)	92.3 (274)
8. Peripheral arterial disease	1.3 (4)
9. Cerebral vascular disease	1.0 (3)
10. Kidney disease	6.7 (20)
11. Cardiac surgery	69.0 (205)
12. CABG	62.3 (185)
13. Valve repair/replacement	7.4 (22)

Clinical Examination	
1. Electrocardiograms at rest and during exercise	100 (297)
2. Exercise stress test	8.4 (25)
3. Transoesophageal echocardiogram (TOE)	0.0 (0)
4. Chest X-ray	83.5(248)
5. Radionuclide Scan	0.0 (0)
6. Coronary angiography	82.5 (245)
7. Echocardiogram	94.3 (280)
Identify Risk Factors	
1. Monitoring weight	96.6 (287)
2. Measuring physical activity	0.0 (0)
3. Measuring smoking	92.3 (274)
4. Measuring nutrition	47.8 (142)
Mobilising Program	
1. Offer mobilising program to return patient to an active level	0.0 (0)
2. Patient assessment of progress	0.0 (0)
3. Report any symptom during activity e.g., chest pain	0.0 (0)
Discharge Plan:	
1. Clear and complementary written discharge plan	0.7 (2)
2. Summarised goal	33.0 (98)
3. Summarised strategies to achieved it	0.0 (0)
4. Referral to outpatient cardiac rehabilitation and promotion of its benefit	3.4 (10)
5. Communication with specialist, general practitioner	18.9 (56)
6. Patient information about medications	1.3 (4)
7. A specific plan for management of symptoms at home including provision of suitable written information about education topics covered (dyspnoea, chest pain, palpitation, cyanosis)	0.0 (0)
8. Contact detail for local community resources including patient support groups	0.0 (0)

- **Documented Secondary Prevention Practices for Outpatient (Follow-up Period)**

As shown in Table 5.9, around half of the participants (46.8%) had their individual and regular health assessment include attention to physical parameters, while no participants had individual assessment for the psychological and social parameters reviewed and documented.

Table 5.9

Documented Secondary Prevention Practices for Outpatients (n = 297)

Documented Secondary Prevention Practice	%
Assessment, Review and Follow-up	
1. Individual assessment and regular review, which include attention to physical parameters	46.8 (139)
2. Individual assessment and regular review, which includes attention to psychological and social parameters	0.0 (0)
3. Referral to appropriate health professionals and services as required	80.1 (238)
4. Discharge or summary letter sent to the GP, cardiologist and other primary care providers are nominated by the patient	17.8 (53)
Physical Activity	
1. Written advice of a physical activity program for patient	1.0 (3)
2. Program involves a minimum of six activity sessions	0.0 (0)
3. Written guidelines for resumption of daily activities, including home walking program	0.0 (0)
4. Physical activity program review at each contact	0.3 (1)
5. Instructions in self-monitoring during physical activity	0.0 (0)
Referral Plan	
1. Referral to ongoing cardiovascular prevention program	0.0 (0)

- **Documented Ongoing Prevention Practices**

For ongoing prevention, no participants had a documented assessment or a management plan for smoking, nutrition, alcohol, physical activity and weight considerations. Furthermore, no participants had documented assessment or management strategies for psychosocial risk factors such as depression and anxiety.

Table 5.10

Documented Ongoing Prevention Practices (n = 297)

Documented Ongoing Prevention	%
Ongoing assessment and management:	
1. Smoking, nutrition, alcohol, physical activity and weight management including identification of individual goals	0.0 (0)
2. Biomedical risk factors (lipid, blood pressure, diabetes)	50.2 (149)
3. Medication (antiplatelets, ACE inhibitors, Beta-blockers, statins, anticoagulants)	44.4 (132)
4. Psychosocial risk factors (depression, anxiety)	0.0 (0)

5.2.5 Secondary Prevention Practices in Saudi Arabia

This section provides additional data to further enhance an understanding of the secondary prevention practices that patients received in Saudi Arabian health services through patient interview. The assessment includes secondary prevention practices during hospitalisation, following discharge, and ongoing prevention.

- **Secondary Prevention Practices During Hospitalisation**

The secondary prevention practices that patients received in Saudi Arabia health services during hospitalisation are summarised in Table 5.11. Responses indicated that few participants received information and education on secondary prevention practices during their hospitalisation. For example, no patients indicated that they had received information and education on the psychological implications of illness (emotional) or about resumption of sexual activity. Only a small number of patients (2.0%) indicated that they had received information and education on the social factors, while a further (4.7%) had received information about resumption of physical activity. Responses also indicated that there are four areas that were covered in the information and education: cardiac condition, treatment, and procedure; medication; modifying some risk factors, including to stop smoking, reduce weight and control BP; and finally on resumption of daily activities: (55%) of participants found this information met their needs.

No participants reported receiving supportive counselling during hospitalisation, in particular in the areas of health behaviours, stress reduction, physical activity, exercise training, management of emotions and management of social relationships.

Table 5.11

Secondary Prevention Practices During Hospitalisation (n = 297)

Secondary Prevention Practices	**% (*N*)**
Received Explanation and Information on:	*N* = 297
1. Cardiac condition, treatment and procedure	44.4 (132)
2. Psychological implication of illness (emotional)	0.0 (0)
3. Social factors	2.0 (6)
4. Medication	67.0 (199)
5. Identification of risk factors	46.5 (138)
6. How to modify the risk factors	55.9 (166)
7. Wound care (if applicable) (*N* = 225)	19.1 (43)
8. Resumption of physical activity	4.7 (14)
9. Resumption of sexual activity	0.0 (0)
10. Resumption of daily living activities (driving)(*N* = 223)	17.4 (39)
11. Resumption of daily living activities (return to work)	22.2 (66)
12. Management of chest pain or other cardiac symptoms	11.1 (33)
What the information/education patient received	*N* = 199*
1. Information on cardiac condition, treatment and procedure	9.1 (18)
2. Information on medication, dose and time	42.8 (85)
3. Information on modifying the risk factors, including to stopping smoking, reduce weight and control BP.	39.0 (77)
4. Information on resumption of daily activities (return to work after 6 weeks)	12.2 (24)
If received, did this information meet their needs	*N* = 199* (55.7%)
Reasons for making this information meet/not meet their needs	*N* = 199*
Meet patients need because it's worthwhile and valuable information/new information	55.7 (111)
Does not meet their needs because there is lack of information	44.3 (88)

Received Supportive Counselling in Following Areas:	*N* = 297
1. About health behaviours to reduce risk of cardiac events	0.0 (0)
2. Nutritional counselling	45.9 (136)
3. Stress reduction	0.0 (0)
4. Diabetes management	38.5 (114)
5. Physical activity	0.0 (0)
6. Exercise training	0.0 (0)
7. Management of emotions	0.0 (0)
8. Management of social relationships	0.0 (0)
Which supportive counselling patients received	*N* = 136*
1. Nutritional counselling	75.0 (102)
2. Diabetes management	63.0 (85)
3. Both counselling	12.0 (16)
If received, did this support meet patient needs	*N* = 136*(36.0%)
Reasons this support meets/does not meet patient needs	*N* = 136*
Meets patients' needs because it helps in choices of good food	36.0 (48)
Does not meet their needs because there is lack of information	64.0 (87)

*Represents the number of people who received information or supportive counselling

- **Secondary Prevention Practices Following Discharge**

As presented in Table 5.12, no participants indicated receiving education following their discharge about resumption of sexual activity or psychological issues (emotional). Further, no participants indicated receiving education about social factors (family and personal relationships, social support/isolation). Furthermore, only 1% of participants indicated being aware of the impact of cardiac disease.

Furthermore, a small number of those interviewed indicated receiving information and education on the CVD risk factors. For example, around one quarter of the sample (25.3%) received information and education on controlling weight, while less than one quarter of the sample (23.6%) received information and education on physical activity. Less than a third of the sample (31.1%) received information about controlling blood pressure and diabetes. A limited number of the sample (18.9%) indicated receiving information about controlling blood cholesterol. Also only a small number of sample (5.1%) were cognisant of managing cardiovascular symptoms, such as chest pain. The majority of those interviewed indicated that this information and education did not meet their needs.

Table 5.12

Secondary Prevention Practices Following Discharge (n = 297)

Secondary Prevention Practices	% (*N*)
Received Education at the Follow-up Visit about:	*N* = 297
1. Basic anatomy and physiology of the heart	0.3 (1)
2. Effect of heart disease	1.0 (3)
3. The healing process, recovery and prognosis	37.7 (112)
4. **Risk factors for heart disease and their modification for secondary prevention:**	
A. Smoking cessation	40.7 (121)
B. Physical activity	23.6 (70)
C. Health eating choices	68.7 (204)
D. Control of blood lipids	18.9 (56)
E. Control of weight	25.3 (75)
F. Control of blood pressure and diabetes	31.1 (92)
5. Skills for changing health behaviour	6.4 (19)
6. Resumption of physical activity	4.0 (12)
7. Resumption of sexual activity	0.0 (0)
8. Resumption of daily activity (driving)(*N* = 223)	6.2 (14)
9. Resumption of daily activities (return to work)	6.1 (18)
10. Psychological issues (emotional)	0.0 (0)
11. Skills development to enable behaviour change and maintenance	1.3 (4)
12. Social factors	0.0 (0)
13. Management of chest pain or other cardiac symptom	5.1 (15)
14. Medication	58.9 (175)
15. Investigations and procedures	59.6 (177)
16. The importance of follow-up by specialist, GP or other primary care provider	71.4 (212)
17. Communicating with specialist, general practitioners and/or other health professionals for follow-up	16.8 (50)
What information/education patients received	*N* = 212*
1. Education on the healing process and recovery	3.1 (6)
2. Education on modification for secondary prevention, such as:	
A. Stop smoking	39.9 (84)
B. Healthy eating choices	69.9 (148)
C. Control of weight	58.8 (124)
D. Control of blood lipids	9.5 (20)
E. Control of blood pressure and diabetes	42.1 (89)
3. Resumption of daily activity (return to work after 6 weeks)	29.5 (62)

4. The medication, dose and time	59.0 (125)
5. Investigation and procedure before next appointment	49.5(104)
If received information, were their needs met (*N* = 212)	*N* = 212* (37.7%)
Reasons for making this information meet/not meet patient needs	*N*=212*
Meets patient needs because it's valuable information	37.7 (79)
Did not meet patient needs because there is lack of information.	63.3 (134)

*Represents the number of people who received information and education

- **Ongoing Prevention for Saudi Cardiac Patients**

Only a small number of the participants who completed the interview (17.9%) indicated that they had communicated with the treating doctor and/or primary care provider regarding ongoing prevention. No patients indicated receiving heart support and/or contact from any other community-based group. Further, no patients indicated having a telephone follow-up, or having ongoing care in a general practice setting.

Table 5.13

Ongoing Prevention for Cardiac Patients (n = 297)

Secondary Prevention Practices	**% (*N*)**
Supported for Maintenance of Behaviour Change through:	*N* = 297
1. Communication with treating doctor and or primary care provider	17.9 (53)
2. Heart support and/or other community based group	0.0 (0)
3. Ongoing access to education as required	0.0 (0)
4. Home or community-based walking and/or other physical activity program	0.0 (0)
5. Individual assessment and referral to appropriate health professional as required	23.6 (70)
6. Telephone follow-up	0.0 (0)
7. Ongoing care in general practice setting	0.0 (0)
Which support was provided	*N* = 70*
Refer patient to primary health provider	67.9 (47)
If received, were patient needs met?	*N* = 70*(27.1%)
Reasons for making this support meet/not meet patient needs	*N* = 70*
Met patient needs because it was easy to follow up	27.1 (18)
Did not meet patient needs because it would not be helpful	73.9 (51)
Received Education Support about the Goals of your Medical Therapy Including:	
1. Medication	11.4 (34)
2. Coordinated program of chronic disease management including ongoing individual medical care	0.0 (0)
3. Monitoring of risk factors (lipid, BP,etc)	26.9 (80)
Which education support patients received	*N* = 80*
1. Going to primary healthcare to receive medication	18.9 (15)
2. Going to primary healthcare for monitoring risk factors (lipid, BP)	56.0 (44)
If received, did this support meet patient needs?	*N* = 80*(30.0%)
Reasons making this support meet/not meet patient needs	*N* = 80*
Meet patients' needs because makes the follow-up more easy	30.0 (24)
Did not meet patient needs because it was not helpful	70.0 (56)

Physical Activity (*N* = 297):	
Involved in regular physical activity program	22.6 (67)
Which programs	*N* = 67*
1. In the gym	26.0 (17)
2. Daily walking	47.2 (31)
If involved, was patient's needs met?	*N* = 67*(71.6%)
Reasons making this meet/not meet patient needs	N=67*
Meets patient need because it improves health	71.6 (48)
Does not meet patient needs because it is a difficult task	29.4 (19)

*Represents the number of people who received information or support

5.2.6 Health-Related Quality of Life of Saudi Cardiac Patients

- **Construct validity of the MacNew**

In Phase One, the Arabic version of the MacNew Heart Disease Health-related Quality of Life instrument demonstrated good reliability and validity (content and criterion). In this Phase the principal component analysis has confirmed the construct validity of the MacNew instrument. The original three-factor structure for the Arabic version was confirmed (with loading ≥ 0.40) explaining 58.3% of the total variance (Table 5.14). The first factor, reflecting an emotional dimension of HRQL, explained 24.2% of variance. The second factor, reflecting a physical dimension of HRQL, explained 18% of the variance, and the third factor reflecting the social dimension of HRQL, explained 16.1% of the variance. In this study, all items loaded satisfactorily in the factor analysis and conformed to the original MacNew factors structure (Valenti et al., 1996). Specifically, for the first factor all of the items that loaded, corresponded well to the result from the original study (Valenti et al., 1996) and studies in other languages (Daskapan et al., 2008; De Gucht et al., 2004; Hiller et al., 2010; Höfer et al., 2003; Leal et al., 2005; Vandereyt et al., 2012; Yu et al., 2008). In this study, item #4 (down in the dumps) loaded highest for factor 1 as in the original study (Valenti et al., 1996) and the Norwegian version (Hiller et al., 2010). Additionally, item #23 (burden on others) did not load in factor 1 as in the original study, where as it was loaded at 0.44. In the current study, the second factor also corresponded well to the results of the original study (Valenti et al., 1996). However, item #14 (chest pain) loaded relatively low for factor 2 compared to the original study. Item #24 (excluded) did not load in factor 2 as in the original study and loaded high in factor 3. A possible explanation is that item #24 is allocated in the scoring system of the MacNew instrument to both physical and social domains. Moreover, the present study found that 7 items of the MacNew instrument loaded in more than one domain with some items loading at ≥ 0.40 in different domains compared to the original study. This result may be explained by the fact that the scoring system of the MacNew allocates some items in more than one domain. The finding of the present study is consistent with other findings of the psychometric testing of the MacNew in different languages (Asadi-Lari et al., 2003; De Gucht et al., 2004; Hiller et al., 2010; Leal et al., 2005).

Table 5.14

Principal Component Analysis of the MacNew Health-Related Quality of Life Questionnaire (Arabic version) (26 Items) (n = 297)

		Emotional	Physical	Social
1.	Frustrated	.74		
2.	Worthless	.61		
3.	Confident	.60		
4.	Down in the dumps	.83		
5.	Relaxed	.70		
6.	Worn out	.59	.39	
7.	Happy with personal life	.73		
8.	Restless	.70		
9.	Short of Breath		.63	
10.	Tearful	.69		
11.	More dependent	.40		.63
12.	Social activities	.59	.41	.63
13.	Others/less confidence in you	.49		.57
14.	Chest pain		.44	
15.	Lack self-confidence	.70		.46
16.	Aching legs		.63	
17.	Sports/exercise limited		.79	.42
18.	Frightened	.63		
19.	Dizzy/lightheaded		.60	
20.	Restricted or limited		.63	.56
21.	Unsure about exercise		.63	.62
22.	Overprotective family			.73
23.	Burden on others			.73
24.	Excluded			.81
25.	Unable to socialize		.41	.63
26.	Physical restricted		.61	.70
Variance explained		24.2%	18%	16.1%

- **Descriptive Analysis of the MacNew**

The Arabic MacNew was completed by the participants in 10–15 minutes. As presented in Table 5.15, the missing item rate was 1% for the following items: 3 (confident), 9 (short of breath), 16 (aching legs), 18 (frightened), 23 (burden on other), and 24 (excluded). Further, 2% was the missing rate for the following items: 11 (more dependent), 12 (social activities), 22 (overprotective family), and item 25 (unable to socialise). Moreover, the missing item rate was 6% for the item 21 (unsure about exercise), and 0% for all other items.

Table 5.15

MacNew Heart Disease Health-Related Quality of Life Questionnaire Item Characteristics (n = 297)

	Missing %	Mean	Std. Deviation
1. Frustrated	0	3.57	2.01
2. Worthless	0	3.74	1.99
3. Confident	1	3.47	2.08
4. Down in the dumps	0	3.60	2.01
5. Relaxed	0	3.52	2.03
6. Worn Out	0	3.44	2.09
7. happy with Personal life	0	3.76	1.57
8. Restless	0	3.61	2.04
9. Short of Breath	1	3.59	2.13
10. Tearful	4	3.76	2.04
11. More Dependent	2	3.65	2.10
12. Social Activities	2	3.53	2.09
13. Others/less Confidence in you	19	3.81	2.13
14. Chest Pain	0	3.62	2.18
15. Lack Self-Confidence	9	3.61	2.15
16. Aching Legs	1	3.71	2.16
17. Sports/Exercise Limited	7	3.64	2.12
18. Frightened	1	3.53	2.18
19. Dizzy/Lightheaded	0	3.77	2.14
20. Restricted or Limited	0	3.60	2.09
21. Unsure about Exercise	6	3.58	2.14
22. Overprotective family	2	3.71	2.14
23. Burden on Others	1	3.69	2.15
24. Excluded	1	3.60	2.17
25. Unable to Socialise	2	3.63	2.13
26. Physical Restricted	0	3.61	2.15

Quality of Life

Emotional, physical and social MacNew Health-related Quality of Life scores are presented in Table 5.16. The mean scores are almost the same for the three domains. The scores for each MacNew domain scale are transformed to range from 0-100.

Table 5.16

The Arabic MacNew Questionnaire Scores (n = 297)

	N	Minimum	Maximum	Mean	Std. Deviation
Emotional Mean Score	297	1.00	7.00	3.60	1.97
Physical Mean Score	297	1.00	7.00	3.60	2.08
Social Mean Score	296	1.00	7.00	3.63	2.06
Emotional MS 100	297	0.00	100.00	51.55	28.24
Physical MS 100	297	0.00	100.00	51.45	29.81
Social MS 100	296	0.00	100.00	51.87	29.51
Valid N (listwise)	296				

- **Relationship Between Patient Health-Related Quality of Life and patient Sociodemographic Characteristics**

The relationships between patient health-related quality of life and patient socio-demographic characteristics are summarised in Table 5.17. The relationship between patient quality of life and gender was first examined using t-tests to determine any differences between the means for males and females on each of the quality of life subscales. The Levene's test indicated that the group variances being compared is significantly unequal (p = .000) and therefore the Welch t-test was performed. The analysis demonstrated that in all HRQL domains, males reported significantly higher HRQL compared to females (Table 5.17).

Relationships between patient health-related quality of life and other demographic variables including patient education, smoking status, and monthly income were first examined using ANOVA. Since the test for normality was violated the Games-Howell post-hoc test that assumes unequal variance was performed. The Game-Howell post-hoc test identified that all quality of life domains are increased as education status increases.

Regarding smoking status, the analysis identified that the sample that gave up smoking had better quality of life in all domains compared to those who are a current smoker and those who never smoked. Results also identified that current smokers reported significantly higher quality of life compared to those who never smoked for all domains.

With respect to income, those with an income 20,000sar and above had significantly higher HRQL compared to the rest of the group for all three domains of health-related quality of life.

Table 5.17

The Relationship Between Saudi Patients Health-related Quality of Life and Socio-demographic Characteristics

Variables		Emotional MS 100				Physical MS 100				Social MS 100			
		N	**Mean**	**Std. Deviation**	***P*-Value**	***N***	**Mean**	**Std. Deviation**	***P*-value**	***N***	**Mean**	**Std. Deviation**	***P*-value**
Gender	Male	223	58.53	27.52	.000	223	58.54	29.16	.000	222	59.18	28.73	.000
	Female	74	30.52	18.26		74	30.11	20.05		74	30.37	19.73	
Education	Unable to read	80	29.01	18.51		80	27.04	18.54		79	27.97	18.90	
	No formal education	62	44.40	21.97		62	44.36	24.12		62	44.79	23.72	
	Up to primary school	68	60.60	25.25	.000	68	61.79	26.00	.000	68	61.58	25.92	.000
	Up to high school	44	69.37	24.02		44	69.83	26.05		44	70.65	25.47	
	University	43	71.24	27.60		43	71.96	28.82		43	72.15	28.44	
	Total	**297**	**51.55**	**28.24**		**297**	**51.45**	**29.81**		**296**	**51.98**	**29.51**	
Smoking Status	Current	153	57.45	27.31		153	57.55	28.81		153	58.08	28.35	
	Given up	37	58.48	28.88		37	57.78	30.71		36	59.49	30.23	
	Never smoked	90	41.55	26.31	.000	90	41.41	28.14	.000	90	41.57	27.92	.000
	Unknown/undocumented	17	36.32	26.26		17	35.99	27.50		17	36.28	27.06	
	Total	**297**	**51.55**	**28.24**		**297**	**51.45**	**29.81**		**296**	**51.98**	**29.51**	
Monthly Income	5,000 or less	39	50.85	33.94		44	48.14	35.14		44	48.89	35.09	
	> 5,000 – 10,000	32	56.73	31.76		32	58.15	31.80		32	58.01	32.06	
	10,000 – 20,000	19	66.35	34.23	.068	20	67.73	35.42	.020	20	67.40	35.16	.040
	20,000 & above	3	97.22	1.37		3	98.61	2.40		3	97.00	4.12	
	Total	**93**	**57.53**	**33.64**		**99**	**56.86**	**34.89**		**99**	**57.04**	**34.73**	

*. The mean difference is significant at the 0.05 level

- **Relationship Between Patient Health-Related Quality of Life and Patient Age**

The relationship between patient HRQL and age was investigated using Pearson Correlation Coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a strong, negative correlation between the two variables, $r = .60$, $p < .000$. This suggests that increase in age is associated with a decrease in QOL for all three domains (Table 5.18).

Table 5.18

The Relationship Between Patient Health-related Quality of Life and Patient Age

Variables		Emotional MS 100	Physical MS 100	Social MS 100
Age	Pearson Correlation	-.647**	-.672**	-.669**
	P-value	.000	.000	.000
	N	271	297	296

**. Correlation is significant at the 0.01 level (2-tailed)

- **Relationship Between Patient HRQL and Patient knowledge and Attitudes Towards Secondary Prevention Programs**

As presented in Table 5.19, there were no significant relationships between patient health-related quality of life and patient knowledge and attitudes towards secondary prevention programs. However, knowledge and attitudes has a strong positive correlation with education.

Table 5.19

The Relationship Between Patient HRQL and Patient Knowledge and Attitudes Towards Secondary Prevention Programs

Variables		Emotional MS 100	Physical MS 100	Social MS 100
Lifestyle Factors Knowledge	Pearson Correlation	-.011	-.004	-.010
	P-value	.857	.950	.867
	N	270	296	295
Dietary Factors Knowledge	Pearson Correlation	.041	.021	.015
	P-value	.501	.713	.791
	N	271	297	296
Cardiovascular Risk Factors Knowledge	Pearson Correlation	.030	-.005	-.006
	P-value	.626	.933	.913
	N	269	295	294
Drugs Attitudes	Pearson Correlation	-.038	-.043	-.043
	P-value	.581	.516	.518
	N	213	232	231
Attitudes towards tobacco use	Pearson Correlation	.077	.108	.098
	P-value	.205	.062	.091
	N	271	297	296
Attitudes towards Exercise	Pearson Correlation	-.050	-.050	-.055
	P-value	.416	.391	.347
	N	270	296	295
Attitudes towards CVD risk Factors	Pearson Correlation	.016	-.006	-.005
	P-value	.799	.912	.927
	N	269	295	294

- **Relationships Between Patient Knowledge and Age, Monthly Income and Education**

Relationships between patient knowledge towards secondary prevention programs and patient age, monthly income, and education were examined using Pearson's correlation coefficient (Table 5.20). There were significant negative correlations of patient's age with knowledge of lifestyle factors and dietary factors and no relationship at all with cardiac risk factor. This suggests that as age increases, knowledge about lifestyle and dietary factors decreases. The strength of relationship shown by the Pearson's correlation values is moderate for both (r = .53, r = .43 respectively)

Further, there were significant positive correlations between income and all the knowledge factors. The higher the income the more likely participants had greater knowledge about health and health behaviours. The strength of relationship of income to lifestyle and dietary factors is moderate (r = .48, r = .53 respectively), although it is less strong with cardiovascular risk factors (r = .28).

The relationship between patient knowledge and education was also significantly positively correlated. The strength of relationships between education and lifestyle and dietary factors is strong for both variables, (r = .60), although it is less strong for cardiovascular risk factors (r = .27).

Table 5.20

The Relationships Between Patient Knowledge and Patient Age, Income and Education

Correlation Variables		Age	Income	Education
Lifestyle Factors Knowledge	Pearson Correlation	$-.533^{**}$	$.487^{**}$	$.649^{**}$
	P-value	.000	.000	.000
	N	296	100	296
Dietary Factors Knowledge	Pearson Correlation	$-.439^{**}$	$.528^{**}$	$.668^{**}$
	P-value	.000	.000	.000
	N	297	100	297
Cardiovascular Risk Factors Knowledge	Pearson Correlation	-.051	$.287^{**}$	$.277^{**}$
	P-value	.385	.004	.000
	N	295	100	295

- **Relationship Between Patient Knowledge and Gender**

The relationship between patient knowledge and gender was examined using Welch's t-test (Table 5.21). The test indicated that only patient knowledge relating to dietary factors was associated with gender, with males being more knowledgeable than females in this area.

Table 5.21

The Relationship Between Patient Knowledge and Gender

Knowledge Factors	Sex	*N*	Mean	Std. Deviation	*p*-value
Lifestyle Factors Knowledge	Male	223	48.94	47.73	.145
	female	74	39.63	46.71	
Dietary Factors Knowledge	Male	223	40.17	46.53	.015*
	female	74	25.94	41.96	
Cardiovascular Risk Factors Knowledge	Male	222	38.13	32.01	.436
	female	73	35.15	26.86	

- **Relationship Between Patient Smoking Status and Patient Knowledge and Attitude Towards Secondary Prevention**

As presented in table 5.22, smoking status was not associated with both patients' knowledge and patients' attitudes towards secondary prevention practices.

Table 5.22

The Relationships Between Patient Knowledge and Attitudes Towards Secondary Prevention Programs and Smoking Status

Smoking Status		*N*	Mean	Std. Deviation	P-value
Lifestyle Factors Knowledge	current	153	51.85	47.73	.130
	given up	37	36.93	47.65	
	never smoked	89	42.32	47.07	
	Total	279	46.83	47.69	
Dietary Factors Knowledge	current	153	41.04	46.83	0.111
	given up	37	34.05	45.91	
	never smoked	90	28.44	42.92	
	Total	280	36.07	45.69	
Cardiovascular Risk Factors Knowledge	current	152	40.13	32.11	0.220
	given up	37	37.38	24.97	
	never smoked	89	32.95	30.66	
	Total	278	37.47	30.86	
Attitudes Towards Drugs	current	122	94.05	23.41	0.882
	given up	28	96.42	18.89	
	never smoked	68	94.48	22.37	
	Total	218	94.49	22.47	
Attitudes Towards Tobacco Use	current	153	33.00	23.29	0.628
	given up	37	28.82	21.39	
	never smoked	90	31.85	25.43	
	Total	280	32.08	23.72	
Attitudes Towards Exercise	current	153	30.71	44.84	0.732

	given up	37	24.32	41.86	
	never smoked	90	28.88	44.95	
	Total	280	29.28	44.39	
Attitudes Towards CVD Risk Factors	current	152	48.90	43.04	0.679
	given up	37	51.35	38.96	
	never smoked	89	53.93	44.24	
	Total	278	50.83	42.83	

5.3 CONCLUSION

This chapter has presented the results of Phase two of this study. The discussion of the findings from Phase two of the study will be presented in the following chapter.

Chapter 6: Discussion

6.1 INTRODUCTION

The present study was designed to examine the health-related behaviours of Saudi people following a recent cardiac event, and to identify the factors that influence these behaviours. Specifically, the aim of Phase Two was to describe patient knowledge, attitudes and behaviours relating to participation in secondary prevention practices, and to describe the current practices in Saudi Arabian health services for patients following a recent cardiac event. Phase two also aimed to identify factors at interpersonal, community and public policy levels that may influence health-related behaviours. This phase also aimed to describe the health-related quality of life of patients in Saudi Arabia after a recent cardiac event. The purpose of this chapter is to discuss the results from Phase Two of the study. An interpretation of the findings from Phase Two of the study will be presented, and discussed with reference to past research and relevant literature.

6.2 PATIENT DEMOGRAPHIC AND BIOMEDICAL CHARACTERISTICS

Overall, the demographic profiles of the participants in this study were representative of cardiac patients in Saudi Arabia, since King Fahd Hospital was involved. The hospital is the largest governmental hospital in Jeddah city, with all emergency cardiac patients transferred to this hospital to receive primary treatment before they are referred to other hospitals. The participants in this study had a relatively young average age of CVD presentation (58.6 years old), comparable to those reported in previous Saudi studies (Al-Khadra, 2003; AlHabib et al., 2012; AlHabib et al., 2011; Kinsara, Najm, Anazi, & Tamim, 2011), and studies in other

Arabian Gulf countries (Awad et al., 2011; Zubaid et al., 2011; Zubaid et al., 2009). The average age of study participants was, however, almost a decade younger than cardiac patients in studies from other developed countries (Goodman et al., 2009; Mehta et al., 2006; Rosengren et al., 2006; Steg et al., 2002). The present study also found that nearly three quarters (68.4%) of cardiac events in the sample were diagnosed with a myocardial infarction. This finding is similar to that of a recent study undertaken in Saudi Arabia which found that more than two-fifths (41.5%) of acute coronary syndrome patients were subsequently diagnosed with MI (AlHabib et al., 2011). This rate of myocardial infarction is comparable to those reported in other Arabian Gulf countries (Zubaid et al., 2009). This higher rate of myocardial infarction is in contrast to other studies conducted in other developed countries, including North and South America, Europe, Australia and New Zealand, which have reported that only one-third of acute coronary syndrome patients are diagnosed with myocardial infarction (Goodman et al., 2009; Mehta, 2006; Rosengren et al., 2006; Steg et al., 2002). The majority of participants in this study were males (75.1%), which is consistent with other Saudi studies (AlHabib et al., 2011), studies in other developing countries (Kinsara et al., 2011; AlHabib et al., 2012; Al-Khadra, 2003), and the INTERHEART study (involving 52 countries) (Yusuf et al., 2004). The proportion of male patients with acute myocardial infarction in the INTERHEART study was the highest across 52 countries. In particular, 86% of cases in the Middle East were male (Yusuf et al., 2004). This is possibly related to the fact that women tend to be several years older than men at the time of diagnosis with CVD (Anand et al., 2008). In addition, Saudi males have a greater exposure to CVD risk factors, such as smoking, and may be less likely to seek care than women (AlHabib et al., 2011; AlHabib et al., 2012). However, recent evidence suggests that the gender gap in mortality is becoming narrower, as women tend to have a high prevalence of risk factors, such as obesity, physical inactivity and there is a rapid increase in smoking rates amongst women (WHO, 2013a).

The present study demonstrated the high prevalence of CVD risk factors among the sample. The present study found a high prevalence of excess body weight among Saudi cardiac patients with a BMI of 28.4kg/m^2, which is above the normal recommended range (<25 kg/m^2) (WHO, 2013a). The majority of the cardiac patients in this study (70.9%) were either overweight (38.6%) or obese (32.3%). The present study also found a high prevalence of smoking among Saudi cardiac patients. Over two thirds (68%) of the participants in this study were current or past smokers, over half of the participants (53.8%) were still smoking and more than one in ten (13.9%) had a history of smoking in the past. To the researcher's knowledge, this is the highest reported rate of smoking noted globally among a general population of any one country and for any cardiac patients.

The present study has also identified that over three-fifths (61.6%) of the Saudi cardiac patients had a history of hypertension and more than half (54.9%) of the participants in this study had diabetes mellitus. The study further found that 67.3% of the participants had elevated cholesterol levels. The high prevalence of CVD risk factors in this study is comparable to those reported in previous national Saudi studies (AlHabib et al., 2011; Al-Nozha et al., 2004), and international studies (Mehio Sibai et al., 2010; Yusuf, et al., 2004). The majority of acute myocardial infarction events (95%) in Middle East countries, including Saudi Arabia are caused by abnormal lipids, smoking, hypertension, diabetes, obesity, lack of consumption of fruit and vegetables and lack of physical activity (Yusuf et al., 2004).

6.3 KNOWLEDGE, ATTITUDES AND BEHAVIOURS RELATED TO PARTICIPATION IN SECONDARY PREVENTION PRACTICES

Overall, this study demonstrated that the participants had limited knowledge and lack of awareness related to all aspects of the established guidelines for secondary prevention practices. Specifically, participants in this study reported a lack of knowledge regarding their medications, although poor knowledge of medications was not associated with attitudes toward adherence to these medications. That is, while the participants demonstrated low levels of knowledge regarding medications, the majority of the participants reported they were advised to take medications and there was a high level of medications adherence. The study also found that there was low levels of knowledge and awareness of major cardiovascular risk factors, and there were misconceptions regarding correct dietary advice and exercise maintenance. In the current study this lack of knowledge was associated with negative attitudes toward maintaining a healthy lifestyle. These knowledge gaps and negative attitudes among participants reinforce the need for improved education of cardiac patients in Saudi Arabia, and more research to better understand the health-related behaviours of Saudi cardiac patients and identify factors that influence these behaviours.

6.3.1 Knowledge and Adherence to Pharmacological Agents

The majority of patients in the sample were advised to take the evidence-based medication regimens as per the American College of Cardiology (ACC)/American Heart Association (AHA) recommendations (Smith et al., 2006; Smith et al., 2011). Ninety two percent of participants were advised to receive aspirin, 93.3% to receive beta-blockers, 89.2% to receive ACE inhibitors and 86.2% to receive statins. Other studies involving individuals with acute coronary syndrome registries undertaken in Saudi Arabia and Arabic Gulf countries have reported similarly high rates of prescribed CVD medications as recommended in the international guidelines for secondary prevention practices, including those published by ACC/AHA (Al Shukry, Rashed, & Zubaid, 2009; AlHabib et al., 2012; AlHabib et al., 2011; Awad et al., 2011; El-Menyar et al., 2009).

Results from previous studies in Europe and the United Sates reflect inconsistency with regard to the rates of use of recommended evidence based medications. These studies have reported that there are significant gaps between the utilisation of recommended guidelines for secondary prevention programs and the uptake of evidence-based practices in developed countries (Bhatt et al., 2006; De Velasco et al., 2002; Kotseva et al., 2009; Mendis et al., 2005; Salomaa, Pääkkönen, Hämäläinen, Niemi, & Klaukka, 2007; Yusuf et al., 2011). For example, the Prospective Urban Rural Epidemiological (PURE) study, which assessed the use of secondary prevention medications in the community, including high, middle, and low-income communities reported that the use of proven inexpensive medications in secondary prevention programs was low worldwide, especially in low-income countries and rural areas, such as Bangladesh, India, Pakistan, and Zimbabwe (Yusuf et al., 2011). In Finland, a study based on national hospital discharge registry data reported that of the patients with existing CVD, 28% did not receive hypolipidemic medications and 15% did not receive beta-blocker medications. (Salomaa et al., 2007). In the REACH (Reduction of Atherothrombosis for Continued Health Registry) survey conducted on 67, 888 patients from 44 countries during 2003 and 2004, the data identified that, although the effectiveness of statins medication has been well established in the published literature, 30.6% of the surveyed patients in this survey did not receive statins (Bhatt et al., 2006). Therefore, although evidence supports the use of prescribed medications as recommended in international guidelines for secondary prevention practices, other evidence from Europe and the United States has identified a significant gap in this area.

The present study also identified that there was a high level of medication adherence among participants. This finding is inconsistent with the previous studies in a Saudi sample (Abou-Auda, 2003; Al-Faris, Abdulghani, Mahdi, Salih, & Al-Kordi, 2002; Al-Hajjaj & Al-Khatim, 2000; Khattab et al., 2010). The greater availability of medications in government hospitals without cost to the patient may explain the high use of these medications. Notably, however, the high use of medications does not necessarily mean that participants will have sufficient knowledge about medications and demonstrate positive health behaviours in terms of adhering to long-term medication prescription. Surprisingly, the present study identified that less than half of the participants were aware of how long they should continue taking medications, while only a small number were aware of the side effects of taking medications. Such lack of knowledge may explain why some participants did not adhere to taking prescribed medications as advised, suggesting that they did not feel the need for this medication. Moreover, some of the participants did not adhere to taking prescribed medications because they experienced side effects. This was despite the fact that the costs of the medication and availability were not barriers to taking medications among this sample.

The findings indicate that some patients in this study were not always taking medication as recommended by international guidelines for secondary prevention practices. These patients need both information and education to improve their knowledge about CVD risk factors and medications (Alm-Roijer et al., 2004; Byrne, Walsh, & Murphy, 2005; Loke & Chan, 2005; Wood, 2005). Health care professionals should, therefore, obtain patients' views of their medications, challenge any concerns or misconceptions that patients may have, and emphasise the importance of taking the medications (Alm-Roijer et al., 2004; Byrne et al., 2005; Loke & Chan, 2005; Wood, 2005). Several studies have found that information about medications contribute to patients' safety and subsequently improve their knowledge and adherence (Borgsteede, Karapinar-Çarkit, Hoffmann, Zoer, & van den Bemt, 2011; Kerzman, Baron-Epel, & Toren, 2005; Nair et al., 2002; Tarn, Paterniti, Williams, Cipri, & Wenger, 2009). Such knowledge can contribute to better compliance with lifestyle changes and adherence to medications (Alm-Roijer et al., 2004). Previous studies have reported that detailed information about medications that successfully reduce patients' concerns, including the names of medication, dosing schedules, how long medication should be taken, underlying conditions and any side effects, are predictors of higher adherence levels to medication regimes (Byrne et al., 2005). Unlike other information about medication, providing information regarding side effects produced conflicting results (Borgsteede et al., 2011). That is, some study findings suggest that patients prefer to receive information about side effects as was the case with the present study (Nair et al., 2002; Tarn et al., 2009). However, other findings indicate that patients prefer not to be informed about side effects as this can result in negative attitudes towards medication (Borgsteede et al., 2011). In this context, health information about secondary prevention medications available for the patients in the sample might be either insufficient or unsuitable to meet the patient's needs. This limited knowledge and lack of awareness may compromise the patients' decisions and attitudes toward participation in secondary prevention practices and commitment to use these medications. Providing patients with comprehensive health information and education to improve patient's knowledge regarding secondary prevention medications therefore is required to motivate patients to adhere to these interventions over the long-term and may result in a more positive attitude toward medication adherence.

6.3.2 Knowledge of CVD Risk Factors and Healthy Lifestyle Factors

The present study found that a significant proportion of the participants lacked knowledge and awareness of major CVD risk factors. This is similar to results from previous studies across a number of different countries (Aldana et al., 2005; Celentano et al., 2004; Eshah et al., 2010; Galbraith et al., 2011; Kling et al., 2013; Mazloomy et al., 2014; Thanavaro, Moore, Anthony, Narsavage, & Delicath, 2006; Wartak et al., 2011). Importantly, findings from this study indicated that only 31.9%, 28.8%, and 28.1% of patients knew that if the blood pressure, blood glucose, and cholesterol, respectively are well controlled, the chance of having another heart attack or stroke will be reduced. Findings from this study also found that 6% of the hypertensive and 5.1% of diabetic patients respectively, were not aware whether they had hypertension or diabetes. Interestingly, 37.1% of patients in the sample with an elevated cholesterol level did not know if they had hypercholesterolaemia. Findings from the present study also indicated that such lack of knowledge was associated with a negative attitude toward monitoring the CVD risk factors among patients in the sample. Only around half of the Saudi cardiac patients in the present study had a check-up for their blood pressure and blood glucose in the previous year, while little more than a third had their blood cholesterol assessed. These findings provide evidence that the participants in this study lacked knowledge and had negative attitudes toward CVD risk factors. This may result in poor motivation to modify

CVD risk factors and adopt healthy behaviours. In this regard, behavioural interventions, including education and counselling that support the creation of a healthy environment may be required for improving patients' knowledge and facilitating their adoption of healthy lifestyle behaviours.

The patients in the current study had some knowledge of healthy lifestyle factors. Nearly half of the participants were aware of the benefits of a healthy diet, quitting smoking, and undertaking regular physical activity in preventing heart attack and stroke. Notably, however, such knowledge of healthy lifestyle factors among the participants was not associated with preventive action or more positive attitudes toward changing behaviour to healthier lifestyle behaviours. This finding is consistent with the finding of Kang, Yang, and Kim's (2010) study, which was conducted to investigate the effect of cardiac knowledge on health behaviours in 157 Korean patients with coronary artery diseases. Kang et al. (2010) found that although the experience of receiving education had a significant influence on health behaviours, there was no significant association between cardiac knowledge and health behaviours. On the other hand, findings from previous studies suggested that knowledge about specific diseases have a significant role in changing patients' behaviour to healthy behaviour and modifying their lifestyle (Alm-Roijer et al., 2004; Kayaniyil et al., 2009; Mosca et al., 2006). Specifically, participants who were aware of the benefits of a heart-healthy diet were less likely to change their attitude and decrease their intake of unhealthy food and lose weight. The average BMI in the current sample was 28.4kg/m^2. This is above the normal expected range. In addition to the negative attitudes toward healthy diet, some misconceptions regarding diet were demonstrated in the current study. To be more specific, only one-third of the participants in the present study had knowledge of the benefits of consuming less oily and fatty food, less salt, less meat, and including more fish in their diet. Moreover, only two-fifths had knowledge of the benefits of including more fruit and vegetables in their daily diet. Over half of the participants indicated that they had difficulty in following healthy dietary advice. The majority of participants could not afford this diet and one-third stated there was a lack of availability. These misconceptions reflect a lack of accurate knowledge about a healthy diet among the patients in this sample. These findings may explain the negative association between the knowledge and the compliance with regard to following a healthy lifestyle. Thus, developing access to healthy food choices and improving understanding and awareness of the benefits of a healthy diet is an important priority in designing CVD risk reduction interventions to change behaviours for this population group.

Other negative associations between knowledge and attitude toward healthy lifestyle factors in this study were demonstrated in smoking habits. The study found that 48.1% of the participants knew that quitting smoking is important to prevent heart attack and stroke. The current study has identified, however, a high prevalence of smoking. The negative relationships between knowledge and attitude toward healthy lifestyle has also been reported among a Saudi health-care professionals' sample (Al-Haqwi et al., 2010; Al-Turki et al., 2010; Behbehani et al., 2004; Hashim, 2000; Taha et al., 2010). There are a number of possible reasons for this knowledge gap. In particular, such a gap may be due to the lack of a consistent initial evaluation of a smoking problem among participants, including assessment of smoking status, patients' readiness to change, psychosocial factors that may impede success and regular follow-up. The study findings indicated that there was no evidence that the smoking problem had been evaluated and that participants were assessed for their smoking status or readiness to change during the hospitalisation period. In addition, a lack of smoking interventions was reported in this study: No patients in this sample had any referral to counselling services or were advised to use pharmacological supports such as nicotine replacement therapy. Interventional studies have reported successful outcomes with smoking cessation strategies in reducing the prevalence of smoking for cardiac patients (Anthonisen et al., 2005; Irmak & Fesci, 2010; Sebregts, Falger, & Bär, 2000). Such strategies include both pharmacological therapies and non-pharmacological programs such as exercise training and telephone contact. Furthermore, there is a lack of policy and regulatory frameworks to protect public health. Many countries have reported success in reducing overall death and disability by developing policies for health issues, such as smoking (Sallis et al., 2008). In this context, support for modifying behaviour in the area of smoking requires collaboration across a range of disciplines to develop clinical practice guidelines which support the implementation of best practice in the assessment and management of smoking habits and to establish a policy and regulatory mechanism to protect public health.

In addition, despite 42.1% of participants reporting knowledge of the benefit of physical activity in reducing the risk of CVD, 70.4% of them reported that they did not engage in at least 30 minutes of moderate physical activity a day. The reasons for the lack of engagement in physical activity were insufficient time (34.4%) and lack of facilities (24.4%), which is similar to results from a previous study (Al-Hazza, 2004a). Importantly, more than half of the participants in the current study (59.8%) believed that physical activity was not good for them. Therefore, a significant barrier for cardiac patients in this study to engage in physical activity was limited knowledge regarding the benefit of exercise and misperceptions about this activity, which is consistent with findings from another Saudi study (Al-Quaiz & Tayel, 2009). These misperceptions may interfere with decisions to change their behaviour or participate in secondary prevention practices, where exercise is one of the most important components of this program. In fact, physical activity is a new habit that has been adapted to the Saudi Arabian context and it needs more time to be accepted. This healthy behaviour did not receive attention and is one of the most difficult tasks to practice among the population in Saudi Arabia (Al-Quaiz &Tayel, 2009). As a consequence, the prevalence of physical inactivity is extremely high and considered among the highest in the world (Al-Hazza, 2004a). In this regard, supporting patients' healthy behaviour through providing walking programs, education and counselling and developing facilities to practice physical activity may be required

The present study found that there is a satisfactory use of recommended guidelines regarding education for some CVD risk factors during hospitalisation. However, it seems that these services are discontinued or unavailable following patients' discharge, which is inconsistent with evidence from international guidelines for secondary prevention practices. For example, while the vast majority of patients (90.6%) were advised to follow a healthy diet to prevent a second cardiac event during hospitalisation, only 79.8% of patients had this advice repeated and monitored in the follow up appointment. Similarly, 56.2% of the participants had received advice to quit smoking during hospitalisation, and only 45.5% of patients were encouraged or advised to quit smoking during their second visit. Regarding physical activity, only 36.4% of the Saudi cardiac patients were advised during hospitalisation to undertake physical activity, and only 33% were given similar advice in the follow-up appointment. The results of this study provide evidence that there is a poor structure to support secondary prevention practices in the setting for this study. In addition, although there exists a range of clinical management guidelines for patients in Saudi Arabia, such as for hypertension and diabetic management, no specific guideline exists for the management of Saudi cardiac patients (WHO, 2006). Additionally, structured secondary prevention programs including cardiac rehabilitation services like education programs are not routinely available (Rawas et al., 2012).

Evidence from interventional studies have confirmed that educational programs modified lifestyle behaviours for cardiac patients in the short-term and dramatically reduce the risk factors in the longer-term (Christian, Rosamond, White, & Mosca, 2007; Eshah et al., 2010; Hardcastle, Taylor, Bailey, & Castle, 2008; Mosca et al., 2006). Such evidence suggests it may be necessary to develop educational programs that implement the best clinical practices to improve health behaviours and improve general awareness about desirable behavioural changes.

Overall, it was found that Saudi cardiac patients in the current study had a lack of knowledge and awareness regarding their medications and cardiovascular risk factors, including blood pressure, blood glucose and cholesterol. The current study also found that although the participants demonstrated some knowledge and awareness of healthy lifestyle factors, some misconceptions regarding these factors were demonstrated. This lack of knowledge may influence patients' decisions to adopt a healthier lifestyle or participate in secondary prevention practices. These findings suggest that Saudi cardiac patients in the current study need to improve their knowledge and attitudes toward disease, risk factors and medication to facilitate their decision-making on lifestyle modifications and compliance with behavioural change. Under such circumstances, developing lifestyle intervention programs for cardiac patients may be required. There is good evidence that intervention programs improve patient knowledge about cardiac health and develop a high level of knowledge

(Aldana et al., 2005; Bayne-Smith et al., 2004; Buckley et al., 2007; Eshah et al., 2010; Skybo & Ryan-Wenger, 2002; Williams et al., 2006). Findings from previous studies identified that intervention programs improve patient knowledge and subsequently improve patient attitude, their health responsibility, nutritional behaviour and interpersonal relationships.

6.4 SECONDARY PREVENTION PRACTICES IN SAUDI ARABIA

Overall, this study found that, in the research context, the documented health practices relevant to secondary prevention following a recent cardiac event reflect limited use of international guidelines duration hospitalisation, follow-up and ongoing prevention periods. For example, physical activity, emotional, and social assessment for participants after a cardiac event are important during all three periods after a cardiac event; however there was limited documentation that these practices were recommended. The findings of this study also indicate that participants did not engage in ongoing cardiovascular prevention programs, with the follow-up visit post cardiac events being the last monitoring stage. While there are 15 heart centres in Saudi Arabia, structured practices consistent with current evidence based guidelines on secondary prevention are not routinely available (Rawas et al., 2012). More commonly, patients are followed up only by a cardiologist in a clinic after discharge from hospital (Rawas et al., 2012). The cardiologist provides verbal instructions for the utilisation of pharmacological and non-pharmacological interventions (Rawas et al., 2012) These findings further justify support for having undertaken this research to identify the factors at the organisational level that may influence patient participation in secondary prevention.

6.4.1 Secondary Prevention Practices During Hospitalisation

The study findings indicate that the overwhelming majority of patients' medical records (96.6%) did not include a comprehensive medical history and documented patient health assessment during hospitalisation, which is inconsistent with evidence-based international guidelines for secondary prevention practices for cardiac patients (King et al., 2005; Sanderson, Southard, & Oldridge, 2004; Smith et al., 2006; Smith et al., 2011). Evidence from these guidelines suggests that the assessment of cardiovascular patients and documented medical history are critical key data elements for assessing CVD risk and understanding the extent of patients' conditions (Cannon et al., 2013). Evidence also strongly supports the need for health care professionals to document the outcomes of patient assessment and prioritise short-term goals that will guide intervention strategies (King et al., 2005; Sanderson et al., 2004; Smith et al., 2006; Smith et al., 2011). One consequence of the lack of documentation of medical history and patient assessment is a possible delay in developing appropriate treatment plans and interventions (Balady et al., 2007). Further, such incomplete clinical information can result in prolonged stays in hospital (Stiell, Forster, Stiell, & van Walraven, 2003). Although medical history and patient assessment are core components of secondary prevention guidelines and such practices can commence after patients are admitted to hospitals with minimal facilities (King et al., 2005; Sanderson et al., 2004; Smith et al., 2006; Smith et al., 2011), the present study indicates that the hospital setting does not consistently follow these guidelines. Under-utilisation of such care processes could be a factor that adversely influences patients' decisions to seek care or participate in health practices.

The current study also identified limited provision of clinical investigation follow-up for patients with certain clinical outcomes, such as ACS patients, who experience ongoing chest pain without diagnosis of MI. Thus, these patients require further clinical investigations such as the exercise stress test or a transoesophageal echocardiogram (TOE). Of concern though is the low percentage of patients who are followed up with an exercise stress test; only 8.4% of cardiac patients undertook an exercise stress test during their period of hospitalisation. It is worth noting that the hospital setting in which the study took place, does not use a TOE or a radionuclide scan as clinical examinations during hospitalisation for patients after cardiac events. These findings point to gaps in adherence to the available evidence-based practices for diagnostic procedures for this population. The gaps between secondary prevention guidelines and actual clinical practice are commonly described in the literature, including in developed countries (De Backer et al., 2003; Kotseva et al., 2009; Ma et al., 2005; Mendis et al., 2005; Qureshi et al., 2001; Wood, 2001). For example, Al-Hazzaa et al. (2004) found that diagnostic procedures for cardiopulmonary diseases, such as exercise tests are extremely under-utilised in Saudi Arabian health services and medical centres. Al- Hazzaa et al. (2004) also found that 85% of the patients did not undertake an exercise stress test. Lack of equipment, lack of trained technicians and lack of training in interpreting test results were reasons identified for not conducting this procedure (Al-Hazzaa et al., 2004). Given the accumulating evidence from Western and Saudi literature about the gaps in applying evidence based practice into a clinical setting, efforts are required to integrate evidence from international guidelines of secondary prevention practices into Saudi Arabian health services.

On the other hand, the present study demonstrated a high use of other clinical examinations, including electrocardiograms (ECG) at rest and during exercise, chest X-ray, and echocardiogram. Importantly, the present study also found high rates of invasive procedures among cardiac patients in Saudi Arabia. This is a similar finding noted by previous Saudi studies (AlHabib et al., 2011) and studies in developed countries, including North and South America, Europe, Australia, and New Zealand (AlHabib et al., 2011; Steg et al., 2002). The present study reported that 82.5% of the participants had coronary angiography as an invasive procedure. Further nearly three-quarters (69%) of patients in the present study had cardiac surgery, 62.3% had coronary artery bypass graft surgery, and 7.4% had a valve repair or replacement. The high use of invasive procedures is likely due to the availability of highly technical capabilities and human resources in Saudi Arabian tertiary hospitals in the last few decades (AlHabib et al., 2011). It seems that although Saudi Arabian health services have a high level of technological care, they lack a strongly structured secondary prevention program for cardiac patients. The lack of such programs at the organisational level may affect patients' decisions and behaviours to seek care.

The American Heart Association and the American College of Cardiology and the National Heart Foundation guidelines all strongly recommend the identification, evaluation and documentation of cardiovascular risk factors at the point of patient admission (American Association for Cardiovascular and Pulmonary Rehabilitation, 2004; Goff et al., 2013; Kannel, McGee, & Gordon, 1976; King et al., 2005; Sanderson et al., 2004; Smith et al., 2006; Smith et al., 2011). In the current study however, identifying CVD risk factors was not a common practice in the study setting, similar to results from a study in the United States (Cooper et al., 2000). Specifically, no patient in the present study had their physical activity assessed and less than a half had their nutritional status assessed. This rate is less than that reported in a US study, which reported that more than half of cardiac patients in the United States do not receive assessment, treatment or control of their CVD risk factors (Cooper et al, 2000). Thus, it could be inferred from these findings that the Saudi Arabian health service in the current study has under-utilised guidelines in identifying cardiovascular risk factors. In addition, it appears that health professionals in the study setting did not provide documentary evidence of use available and proven evidence regarding cardiac patients during hospitalisation. This is possibly related to the lack of a strong, structured program to follow for secondary prevention practices for cardiac patients. In this regard, establishing a best practice guideline to implement the well documented evidence-based practices guidelines for cardiac patients, particularly following diagnosis of ACS, may be required.

The study identified that supportive counselling for patients with existing CVD is not commonly available in the hospital setting. To be more specific, no patients in this sample received supportive counselling about utilising positive health behaviours to assist in reducing the risk of cardiac events, stress, increasing physical activity, and exercise training, while managing emotional health, and promoting strong social relationships. The findings did not reflect evidence from international guidelines for secondary prevention practices, which strongly recommend that all patients with existing CVD should be counselled regarding the need for lifestyle modification, including weight control, increased physical activity, emphasis on increased consumption of fresh fruits, vegetables and low-fat dairy products (Appel et al., 2011; Appel et al., 1997; Chobanian et al., 2003; Sacks et al., 2001; Whelton, Chin, Xin, & He, 2002). A likely possible explanation is that there is a lack of such counselling services provision in the clinical setting.

On the other hand, the majority of the participants reported receiving nutritional counselling, 63% diabetes management education and 12% counselling for both. Whilst nutritional and diabetes management counselling were reported, 63% of participants reported that this counselling did not support them or help them in changing behaviour. It seems that the participants in this study did not benefit even when services were available. The counselling services, therefore, need to be modified and strongly structured programs for counselling need to be made available to cardiac patients and appropriate family members in Saudi Arabia. Counselling services should be aimed at solving problems and offering advice and they should involve interaction with patients, including the provision of information as well as assessment, support and specific advice related to cardiovascular problems (Steinke et al., 2013).

Physical activity assessment and mobilisation programs for patients after cardiac events are important in all secondary prevention periods (during hospitalisation, follow-up and ongoing prevention). Practices in this setting are therefore not consistent with evidence from international guidelines for the assessment of physical activity in secondary prevention practices (American College of Sports Medicine [ACSM], 2006; Piña et al., 2003; Smith et al., 2006; Smith et al., 2011; Strath et al., 2013; Thompson et al., 2003). The present study findings demonstrated that the hospital setting did not assess patients for current physical activity levels at the time of admission. The study findings also demonstrated that the setting of this study did not provide documented evidence about mobilisation programs to return patients to a physically active level after a cardiac event. Patient assessment of progress and reporting any symptom during physical activity, such as chest pain, are also not available for cardiac patients in this study setting. Regarding the follow-up period, the study findings indicate that limited attention was given to physical activity in this period as there was limited documentation about exercise activities in patients' medical records. There was also limited documentation about written guidelines for resumption of daily activities, including a home walking program. There was also limited documentation about instructions in self-monitoring during physical activity, and just 0.3% of participants had a physical activity program reviewed at each follow-up appointment. The study also found that only 1% had written advice about a physical activity program. Evidence from the guidelines relating to the assessment of physical activity for cardiac patients suggests that all patients should be assessed for current physical activity levels and their needs determined (ACSM, 2006; Piña, et al., 2003; Smith et al., 2006; Smith et al., 2011; Strath et al., 2013; Thompson et al., 2003). Also an evaluation of activities that are relevant to patients' age, gender and daily activities should be established. This should be followed by an assessment for patients' readiness to change their behaviour and barriers to increased physical activity (ACSM, 2006; Piña et al., 2003; Smith et al., 2006; Smith et al., 2011; Strath et al., 2013; Thompson et al., 2003). Finally, health care professionals should provide patients with advice, support and counselling, and consistently encourage patients to accumulate 30 to 60 minutes activity per day (ACSM, 2006; Piña et al., 2003; Smith et al., 2006; Smith et al., 2011; Strath et al., 2013; Thompson et al., 2003). The study findings regarding physical activity in the study setting therefore, identify a significant issue that should be taken into account when designing secondary prevention programs for this population group.

The present study identified that providing information and education for cardiac patients during three follow-up periods of time is not a common practice for health professionals in the study setting. The participants reported that they did not receive information and education on the psychological implications of cardiac disease (emotional) or resumption of sexual activity after a cardiac event during the three periods. The present study also identified that only a very small number (2%) of participants reported that they received information and education on social factors and only slightly more (4.7%) received information about resumption of physical activity after a cardiac event. Such evidence further confirms that the secondary prevention practices in this study do not attend to the physical, emotional and the social health for cardiac patients, which could influence their quality of life negatively.

Evidence from systematic reviews suggests that patients who have experienced a cardiac event should be supported to cope with numerous changes in their lives including the consequences of disease through assessment, support, and education (Steinke et al., 2013). The psychological implications of cardiac disease, such as fear, anxiety and depression impair the quality of life for patients and their partners. Psychological factors (fear, anxiety and depression) also influence participation in sexual activity (Mosack & Steinke, 2009; Steinke, 2010; Steinke et al., 2013). Returning to sexual activity is a common concern of cardiac patients and their partners (Mosack & Steinke, 2009; Steinke, 2010; Steinke et al., 2013). While the question about sexual activity was removed from the MacNew questionnaire, this question was addressed in the application of other instruments and acknowledged as an important factor for inclusion in the overall assessment of CVD secondary prevention programs.

Early assessment of psychological factors, which provides information and education to manage patients' fears, is strongly recommended in secondary prevention guidelines for cardiac patients (Steinke et al., 2013). In addition, it is strongly recommended that patients with existing CVD and their partners are involved in sexual counselling to receive information as well as assessment, support and advice related to psychological and sexual problems. It is recommended that sexual counselling be offered to all CVD patients regardless of age, gender, culture, or sexual orientation (Byrne, Doherty, McGee, & Murphy, 2010; Doherty, Byrne, Murphy, & McGee, 2011; Goossens et al., 2011; Gott, Galena, Hinchliff, & Elford, 2004; Hardin, 2007; Jaarsma et al., 2010; Steinke, Barnason, Mosack, & Wright, 2011; Steinke, Mosack, Barnason, & Wright, 2011). Findings from qualitative studies have reported that cardiac patients report a desire to receive information and education regarding sexual functioning and advice about a safe time to return to this activity after a myocardial infarction (Altiok & Yilmaz, 2011; Mosack & Steinke, 2009; Mosack et al., 2011; Steinke & Patterson-Midgley, 1998). Studies have also reported that physiological and psychological issues, including anxiety, fear of having another MI event, changes in self-perception and inadequate knowledge regarding the impact of heart medications are barriers for patients to resuming sexual activity (Altiok & Yilmaz, 2011; Mosack & Steinke, 2009; Mosack et al., 2011; Steinke & Patterson-Midgley, 1998). These findings suggest that receiving information, education and support are important strategies to help patients change behaviours. However, these strategies were less likely to be used in the clinical setting for the present study. For instance, in the present study as previously mentioned, no patients reported receiving information and education about the resumption of sexual activity. In fact, a review of the literature indicates that sexual health care services are a significant issue in Saudi Arabia. Alzahrani (2011) conducted a qualitative study to describe how women and health care professionals perceived sexual health and services that are currently provided in Saudi Arabia. Alzahrani (2011) found in her study that in Saudi Arabian health services there were no written strategies, guidelines or education material for sexual health care. In addition, the health care professionals in Saudi Arabian health services avoid discussing sexual health with patients for a number of reasons, including lack of knowledge and confidence in sexual health issues, respecting the cultural norms of patients, and the sensitivity of the topic (Alzahrani, 2011). Further consideration should be given to Alm-Roijer and colleagues' (2004) argument that patients should receive proper information, education and support to both change and maintain adequate lifestyle changes and comply with therapeutic interventions. An inadequate understanding of disease may cause unwarranted emotional distress, inappropriate coping behaviours, non-compliance with medical advice and unnecessary disease progression (Kayaniyil et al., 2009). Thus, failure to provide Saudi Arabian patients in this sample with information and education that supports them to cope with changes in their lives and subsequently improve their quality of life may influence their decision to change their behaviour to healthy lifestyle behaviours.

The participants in this study determined four areas about which they had received information and education during hospitalisation. The participants reported that they received minimal information and education about their cardiac condition, treatment and procedure; the dose of medications and time; how to modify some of the risk factors, including reducing weight and controlling BP; and, finally on resumption of work six weeks after their cardiac events. About half of the participants reported that the information and education they received met their needs, as this was new and valued information for them. Although cardiac patients in this study reported receiving information and education in some areas, they did not report receiving information and education on areas considered core components of secondary prevention programs with a high level of evidence in the international guidelines. These areas are: effects of heart disease, risk factors for heart disease and their modification for ongoing prevention (smoking cessation, physical activity), support for skill development to enable behavioural change, resumption of physical and sexual activity, psychological issues (depression and sleep disturbance) and social factors. Developing a comprehensive educational approach that meets individual needs and facilitates behavioural change and maintenance may therefore be required.

A documented discharge plan, that summarised long-term goals and strategies for enhancing participants' ongoing health status, was also absent in this setting. Importantly, the present study identified that patients' medical records identified no details of ongoing health goals or a specific plan for management of common cardiac health symptoms. Thus, the provision of symptom identification and management which can easily be provided through brief discussion and reinforcement with written information for commonly experienced problems such as dyspnoea, chest pain, and palpitations, was not documented as occurring in the medical records. The study also found that patients' records did not include contact details for local community resources, including patient support groups. The study findings indicated that only 1.3% of patients' medical records included information about medications in the discharge plan, and only 3.4% had details of referral to an out-patient cardiac rehabilitation program. At least the referral to cardiac rehabilitation was accompanied with written material confirming the benefits; such findings are similar to those found in a Saudi study (Mahrous, 2013). Mahrous (2013) found that the level of Saudi patients' satisfaction with information offered and written planning at hospital discharge was extremely low. The percentage of satisfied participants in his study was under 50% for all questions. In particular, some items on the questionnaire had surprisingly low satisfaction ratings in the important areas, including information about whom to call if assistance is needed in case of complications, about the possible side effects of medications, the impact of the diseases on patients and their families, arrangements for follow-up, and a written discharge plan, that explains the medical problem and post-discharge instructions (Mahrous, 2013). In this context, efforts to develop appropriate discharge information and a plan that enables patients to achieve and maintain an optimal level of health may be required.

6.4.2 Secondary Prevention Practices Following Discharge

The present study found limited evidence of the use of international guidelines regarding the secondary prevention practices for outpatients with existing CVD (follow-up period) in the study setting. To be more specific, the study findings indicated that there was limited documentation about individual assessment and regular reviews at follow-up visits. This finding is inconsistent with evidence from international guidelines which suggest that health care professionals should have documented evidence of patient outcomes that reflect progress toward goals, including whether the patient is taking appropriate medication (King et al., 2005; Sanderson et al., 2004; Smith et al., 2006; Smith et al., 2011). This may be related to the large number of patients who present to outpatient clinics, who only have a short period of time to be reviewed by health care professions who thus are not able to spend enough time with patients to encourage and reinforce ongoing secondary prevention strategies. Crowded outpatient clinics are unfortunately a common encounter in Saudi government hospitals. For example, The King Fahd hospital, where the study was conducted, has reported that the number of outpatients visiting the cardiac clinic can be as high as 50 outpatients in the clinic time on some days. Such time constraints do not support a longer-term health maintenance strategy with an emphasis on positive supported change to healthy behaviours.

The findings indicate that the follow-up programs for cardiac patients in this sample lacked a consistent, structured approach. Furthermore, only 1% of participants were aware of the impact of cardiac disease with a further small number, 5.1%, cognisant of how to manage cardiovascular symptoms, such as chest pain. The study also found that providing patients with information and education around modifying cardiovascular risk factors is not practised in the study setting. Around one quarter of patients received information on controlling weight, while less than one-quarter received information on the importance of undertaking regular physical activity. Less than a third received information about controlling blood pressure and diabetes. A limited number indicated receiving information about controlling blood cholesterol. Although the participants reported that they received brief information about some modification of CVD risk factors, such as healthy eating choices, controlling weight, controlling lipids and blood pressure, this information and education did not meet most (63.3%) patients' needs. The finding highlights the issue of the need for a strong educational approach and suggests that the problem still remains in the secondary prevention strategies that were provided to the participants in the follow-up period. The educational approach needs to be consistent and structured and available to cardiac patients in all three periods after cardiac events to enable and sustain behavioural change and maintenance.

6.4.3 Ongoing Prevention for Cardiac Patients

The study also found that in the follow-up visit, no referral plans for ongoing cardiovascular prevention programs were documented in patients' medical records.

The ongoing prevention practices for cardiac patients in this setting were under-utilised international guidelines (King et al., 2005; Sanderson et al., 2004; Smith et al., 2006; Smith et al., 2011). This reflects the lack of known structured secondary prevention programs, including cardiac rehabilitation services available for cardiac patients in Saudi Arabia (Rawas et al., 2012). Importantly, the data in this study demonstrated that the comprehensive risk reduction and long-term care of cardiac patients are not routinely available in this setting. This became apparent on review of the patients' medical records, where there was no reference to the documentation of risk reducing strategies for the reduction of smoking, enhancement of nutritional status or avoidance of alcohol. Also there was no support for the engagement of regular physical activity or weight assessment and management considerations, including identification of individual health behaviour goals. Thus, the lack of secondary prevention strategies for CVD patients in Saudi Arabian health services is likely to contribute to the growth of the burden of this disease and reduce the motivation of patients to make decisions to change their behaviours.

The findings further indicate that supportive services for change and maintenance of behavioural change are not available in the study setting. Participants reported that they did not receive any heart health support, community based cardiac rehabilitation group referral, or individual telephone follow-up care. Participants also reported that they did not have any ongoing access to education or receive ongoing care in the community. They also noted that they did not receive a home or community-based walking or other physical activity program or coordinated programs for chronic disease management. These findings indicate that there are clearly inadequate supportive services for cardiac patients in this sample at the organisational level that could help to change their behaviour. The lack of these services in organisations could influence the degree of encouragement and supportive processes required to achieve behavioural changes among cardiac patients.

6.5 HEALTH-RELATED QUALITY OF LIFE OF SAUDI CARDIAC PATIENTS

The present study found that the health-related quality of life scores for cardiac patients in the current study were low, which is consistent with results from previous studies (Hiller et al., 2010; Höfer et al., 2012; Höfer et al., 2008; Nakajima et al., 2009; Vandereyt et al., 2012; Yu et al., 2008). Importantly, participants in this study reported a mean of 3.6 HRQL, which was less than their counterparts in an American and Canadian sample (Höfer et al., 2012), an Austrian and Swiss sample (Höfer et al., 2008), a Norwegian sample (Hiller et al, 2010), a Brazilian sample (Nakajima et al., 2009) a Chinese sample (Yu et al., 2008) and a Flemish sample (Vandereyt et al., 2012). The low mean scores are almost the same for the three domains in the current study. These findings provide evidence that the health-related quality of life of patients in this study is influenced negatively after a cardiac event, which could affect their adoption of a healthy lifestyle to reduce the risk factors of recurrent events (Goldston & Baillie, 2008). There are a number of possible explanations for the poor HRQL among the participants in the current study. Such poor HRQL may be due to a lack of awareness of the function of physical activity in improving HRQL and thus most participants did not engage in physical activity. In addition, very few patients in this study reported participation in modifying behavioural risk factors nor did they appear to have a positive attitude toward healthy lifestyle factor adoption practices, which may have improved their HRQL. Furthermore, inadequate health assessment, provision of ongoing health prevention education, and promotion of psychological factors in the health service setting were reported in the current study. In this regard, collaborative efforts are required to increase awareness of interventions to reduce the risk of morbidity and mortality associated with poor quality of life in cardiac patients and emphasise the implementation of best practice evidence in the assessment and management of HRQL of patients with CVD.

Male and young participants reported significantly higher health-related quality of life compared to females and older patients. This is similar to the results from previous studies (Agewall, Berglund, & Henareh, 2004; Dixon et al., 2002; Kaya et al., 2007; Kristofferzon, Löfmark, & Carlsson, 2005; Maes et al., 2008; Peric et al., 2010; White & Groh, 2007; Yu et al., 2008). A prospective study of 536 patients (35% women) with a 12-month follow-up was undertaken to evaluate quality of life among men and women with coronary heart disease (CHD) (Emery et al., 2004). The study found that although the quality of life had improved for both genders over the 12-month follow-up, quality of life was worse for women during this time. In addition, the study also found that there was a significant impairment in physical and emotional quality of life among women (Emery et al., 2004). However, the exact relationship between reduced quality of life after a cardiac event in women compared with men is not known (Agewall et al., 2004; Guallar-Castillón, Redondo Sendino, Banegas, López-García, & Rodríguez-Artalejo, 2005). Further studies are needed to examine the exact mechanisms underpinning these findings. In this context, support for health-related quality of life, especially for women after a cardiac event, may require more planning in the development of a targeted psychological management approach in secondary prevention practices.

The present study found positive relationships between patients' quality of life and their socio-economic status (education and income). All health-related quality of life domains increase as education and income status increases. This is similar to results from previous studies (Heo, Moser, Chung, & Lennie, 2012). This may be because a high level of education is a facilitator to healthy lifestyle behaviour and subsequently improves patient's health-related quality of life (Winkleby, Jatulis, Frank, & Fortmann, 1992). In addition, people with a high income are more likely to seek health care and maintain good health, which leads to a better quality of life.

Regarding smoking status, unexpected relationships were identified in the current study. The study findings demonstrate that the participants who gave up smoking had a better quality of life in all domains compared to those who continued to smoke and those who never smoked. Results also identified that current smokers reported a significantly higher quality of life compared to those who never smoked for all domains. These findings are inconsistent with findings from previous studies (Rumsfeld et al., 2003; Stafford, Berk, & Jackson, 2013; Taira et al., 2000). The possible reasons for these findings are because there are confounding factors that this result can be attributed. Further research is required to examine these relationships and other confounding factors.

Different cross-sectional studies have been undertaken to examine the impact of smoking on QOL among the general population (Hirdes & Maxwell, 1994; Lyons, Lo, & Littlepage, 1994; Sarna, Bialous, Cooley, Jun, & Feskanich, 2008; Tillmann & Silcock, 1997; Toghianifar et al., 2012). Findings from these studies found that smokers have a worse quality of life compared with non-smokers. Other studies conducted to examine the impact of smoking on quality of life among cardiac patients (Rumsfeld et al., 2003; Stafford et al., 2013; Taira et al., 2000) reported similar findings on the impact of smoking on QOL. Taira and colleagues (2000), for example, undertook a longitudinal study to examine the impact of smoking on QOL among coronary artery disease patients requiring percutaneous coronary revascularisation. The study found that continued smoking after percutaneous transluminal coronary angioplasty (PTCA) procedure significantly diminished the health-related quality of life benefits of this procedure. More recently, Stafford and colleagues (2013) conducted a prospective study to examine the association between smoking and depression and health-related quality of life in patients with heart diseases. The study found that smoking was independently associated with depression and poor mental health-related quality of life (Stafford et al., 2013).

6.6 FACTORS INFLUENCING HEALTH-RELATED BEHAVIOUR

McLeroy et al.'s (1988) Ecological Model of Health Behaviour proposes that any individual behaviour is influenced by factors related to multiple levels. In particular, the model hypothesises that factors at the intrapersonal, interpersonal, organisational, community and public policy levels can influence specific health behaviours. The following sections discuss the present study's findings relating to questions regarding the influence of these various factors on the health of the Saudi Arabian cardiac patients in this sample in relation to secondary prevention practices.

6.6.1 Intrapersonal (Individual) Factors

Overall, the study findings support the Ecological Model of Health Behaviour in predicting that factors at an intrapersonal level, including knowledge and attitudes influence health-related behaviour and behavioural change. Specifically, patients' knowledge and attitudes in this study were strongly associated with their health behaviours. Participants in this study who reported lower levels of knowledge and awareness in all aspects of secondary prevention practice guidelines were more likely to have negative attitudes toward behavioural change. This finding is consistent with those from previous studies which have reported a significant relationship between patients' knowledge of CVD risk factors and compliance with behavioural change (Alm-Roijer et al., 2004; Celentano et al., 2004; Chan et al., 2011; Eshah et al., 2010; Mosca et al., 2006; Wartak et al., 2011). Results from these previous studies suggest that patients who have poor knowledge regarding disease risk factors tend to be less motivated to modify these factors and may need more support to change their behaviours. In addition, these studies report that poor knowledge can be a barrier for patients achieving their health goals and as such can negatively impact on health outcomes. These findings together with the results from the current study suggest that patients with a high level of knowledge are more likely to undertake healthy lifestyles choices even when faced with practical difficulties during follow-up after disease diagnosis. Improving patients' knowledge and attitudes regarding cardiac diseases and CVD risk factors may, therefore, help to achieve desired behaviour change and enhance participation in secondary prevention practices.

The theoretical framework for this study also emphasises that the investigation of health problems should incorporate two or more analytical levels to allow for comprehensive multi-level interventions to be developed that have greater impact. Results from the current study indicate that examining health behaviour at the intrapersonal level alone was not enough to determine the factors influencing patients' behaviours. For example, the present study identified conflicting relationships between patients' knowledge and attitudes or behaviours in two areas. Firstly, although participants in the current study demonstrated a lack of knowledge regarding medications, there was a high level of use of medications among the participants. A possible explanation for the high use of cardiac medications is the free access and ease of availability of these medications. It is also possible that taking medication is a relatively simple activity that does not require the significant personal effort and motivation that behaviours such as exercise and dietary change require. As such, consistent with the theoretical framework for the present study, it is critical to understand other external and personal factors that influence an individual's engagement in desired health behaviours. While participants in this study demonstrated some knowledge regarding healthy lifestyle factors, knowledge alone was not sufficient to ensure change in behaviours. This finding is consistent with reports from previous studies (Anderson & Larrabee, 2006; Dao et al., 2008; Kang et al., 2010), indicating that knowledge of CVD risk factors may not be sufficient to change and maintain healthy behaviour. Such findings support the need to examine multiple factors to understand the range of influences on health behaviours and subsequently, to choose the most appropriate interventions.

With regard to the influence of socio-economic status on health behaviour, the theoretical framework for the present study proposes that such characteristics are directly linked to an individual's health behaviour. The current study identified that individual characteristics, particularly those related to age and socio-economic status consistently demonstrated an influence on level of knowledge, and consequently are likely to be important determinants of a patient's health behaviours. This finding is consistent with those from previous studies across different countries (Kayaniyil et al., 2009; Khan et al., 2006; Momtahan, Berkman, Sellick, Kearns, & Lauzon, 2004; Oliver-McNeil & Artinian, 2002; Potvin, Richard, & Edwards, 2000). Participants in the current study with lower education levels had lower levels of knowledge, and patients with higher levels of education were more likely to know about CVD risk factors and healthy lifestyle factors. Such findings are consistent with the growing body of research which indicates that higher education levels are a strong predictor of good health, as one's social circumstances influence lifestyle behaviour, problem-solving abilities and positive values (Albert, Glynn, Buring, & Ridker, 2006).

In addition, older people in the current study were less likely than younger people to identify CVD risk factors and there were significant positive correlations between income and patients' knowledge about all factors. Such findings highlight an important problem in Saudi Arabia, whereby low socio-economic status is strongly associated with high prevalence of CVD risk factors (WHO, 2014, NVDPA, 2012). These types of relationships have been observed in several studies in other parts of the world. For example, one prospective study conducted to assess the relationship between two indicators of socio-economic status (education and income) and CVD risk factors (Albert et al., 2006). The study involved 22,688 female health professionals who were followed up over a 10-year period. The study reported that there was a progressive decrease in incidence of CVD events with increasing levels of education and income (Albert et al., 2006). While socio-economic factors are not modifiable by individual behavioural interventions, these findings highlight the importance of identifying those whose social circumstances place them at greater risk of poorer health outcomes and the need to consider broader social policy level intervention to improve outcomes.

The current study did not identify any relationship between smoking status and patient knowledge and attitudes toward secondary prevention programs. This finding differs to those from previous studies that have identified that the level of knowledge and degree of positive attitudes (desire to change behaviour) of smokers improves with the level of smoking (Khattab et al., 1999). Similarly, findings from the present study did not identify a relationship between health-related quality of life and patients' knowledge and attitudes toward participation in secondary prevention practices. This result also differs to those from previous studies that have identified that greater knowledge and more positive attitudes are facilitators for adoption of a healthier lifestyle with subsequent improvement in patients' quality of life and general disease outcomes (Alm-Roijier et al., 2004). Such findings may be because average knowledge and attitudes in the current study were lower and less positive than that reported in previous studies, and as such did not have a significant effect on quality of life.

The study also identified that male participants were more likely to identify healthy dietary factors than women. These findings highlight the importance of education for women, as women in Saudi Arabia traditionally are responsible for cooking for the family (Rawas et al., 2012). In this regard, interventions that target women to help improve their knowledge about healthy dietary practices and meal planning may be required as part of secondary prevention programs for this population group.

6.6.2 Interpersonal Factors

In addition to intrapersonal factors, people's interactions with other social networks have also been identified as important influencers on health-related behaviours of individuals. For example, families' and friends' behaviours and attitudes have been shown in a large number of studies to be a particularly powerful force in shaping behaviours (Emmons, 2000; McLeroy et al., 1988; Whittemore et al., 2004). A review of the Saudi literature regarding the influence of interpersonal factors supported the relationship between the family or friend's behaviours and the individuals' behaviours. More specifically, different studies indicate the influence of friends and family is important in deciding to begin or continue practicing many health behaviours, including smoking. Al-Mohamed and Amin (2010), for example, found that individuals whose parents and friends were smokers were twice as likely to smoke as those whose parents and friends had never smoked. Such results indicate that choosing an appropriate intervention to change behaviours should take a family-focused direction, including the influence of outside members, such as peers, as these are key factors that influence an individual's behaviours. This is consistent with the assumptions of the theoretical framework for the present study which proposes that social networks can influence morbidity and mortality of disease through behavioural processes. Specifically, social networks are hypothesised to be a health promoting factor that can facilitate or hinder healthier behaviours for individuals, such as choosing healthy food options (Cohen et al., 2000; Lett et al., 2005; Uchino, 2004, 2006). Studies in Saudi Arabia have identified a high prevalence of overweightness and obesity among adults in Saudi Arabia, especially among Saudi women (Al-Othaimeen, Al-Nozha, & Osman, 2007; Alsaif et al., 2002; Ng, Zaghloul, Ali, Harrison, & Popkin, 2011; Osman & Al-Nozha, 2000). Traditional meals in Saudi Arabia include a main dish of meat or chicken and two or three other kinds of dishes that are rich in fat and sugar. Such traditions may prevent women from working to facilitate healthy behaviours through use of healthier food choices for their family. Therefore, interventions that target women in Saudi Arabia may be required as women play a significant role in determining the food choice for the family and providing familial support for healthy behaviours in regard to food.

In terms of support from health professionals, the present study identified a relationship between health care professionals' support and individuals' health-related behaviours. Higher levels of support and interaction with the patient were found to influence engagement in secondary prevention in this study. For instance, the majority of participants in the present study indicated they were advised by health professionals to take common first line cardiac medications, and there is high level use of these medications among the participants. Furthermore, the present study also found that lack of support from healthcare professionals negatively influenced engagement in secondary prevention practices among participants. More specifically, findings from the current study identified that just over 30% of the participants were advised by health care professionals to engage in physical activity. The current study also identified that the majority of participants reported they did not engage in at least 30 minutes of moderate physical activity a day. These findings support the argument that positive change behaviours require more involvement by health professionals. Health care professionals in Saudi Arabia need to be more supportive of patients who have experienced a cardiac event to promote behavioural changes and modification of lifestyle choices.

6.6.3 Organisational Factors

The theoretical framework for the study suggests that organisational structure and processes influence an individual's health and health behaviour (McLeroy et al., 1988). The findings support McLeroy and colleagues' (1988) Ecological Model of Health Behaviour by confirming that the health care processes in the hospital setting where this study was conducted are likely to be an important influence on health behaviours of participants. In particular, findings from the present study identified that the health care processes that were provided for participants were inconsistent with international guidelines for secondary prevention practices after cardiac events. The lack of a systematic approach to secondary prevention is therefore likely to have a negative impact on the ability to achieve positive behaviour change including, participation in secondary prevention programs. This is seen in the process of admitting participants to the hospital and then referring them from one phase of secondary prevention to another. More specifically, the health care admission and assessment process for patients in this study, through taking a comprehensive medical history and patient assessment, including diagnostic procedures, were missing for the majority of the participants. Further, the process of patient discharge from hospital and referral to the next phase of secondary prevention was not common available in the hospital setting. There was also no structured long-term intervention. This lack of service provision across transitions over the trajectory of illness means that participants have limited support to promote behavioural change and limited motivational influences to participate in different phases of secondary prevention programs.

The framework proposes that organisational factors, including models of health services delivery, can influence health behaviour by supporting or enhancing core skills for behavioural change (McLeroy et al., 1988). The study findings demonstrate limited supportive counselling services to facilitate healthy behaviour change. Although nutrition and diabetes mellitus management counselling were available, most participants reported that this counselling did not support or help to change their behaviour. The lack of key secondary prevention services is likely to negatively impact on the development and maintenance of skills for long-term behavioural change.

The findings also provide evidence of poorly structured secondary prevention programs operating in Saudi Arabia, especially in respect of the educational approaches. More specifically, the participants in the current study reported not receiving information and education during the three phases of secondary prevention programs. Although some of the participants reported receiving limited education during hospitalisation, this approach was not continued in the follow-up visit period.

Such evidence emphasises the importance of developing a more comprehensive educational approach that is tailored to an individual's needs to facilitate behavioural change.

The theoretical framework supports the provision by organisations of essential resources for intervention to encourage behavioural change (McLeroy et al., 1988). Ongoing prevention strategies seem to be lacking in this hospital setting. This may be because of a lack of resources to provide structured secondary prevention programs like cardiac rehabilitation services. Cardiac rehabilitation services include all programs that assist cardiac patients in changing their behaviour and improving their quality of life following a cardiac event. This study confirms that there is limited availability of clinical management guidelines or preventative care policies, such as a comprehensive risk reduction policy or a long-term cardiac patient care policy in Saudi Arabian health services (Rawas et al., 2012). The participants received follow-up care in a clinic after they were discharged from the hospital, but only received verbal instruction regarding preventive health interventions during visits. This lack of structured evidence based services is likely to be an important factor contributing to the limited uptake of healthy behaviours that minimises the risk of further cardiac events.

6.6.4 Community Factors

The McLeroy and colleagues (1988) Ecological Model of Health Behaviour notes that community factors comprise the fourth level of analysis that needs to be considered to understand health-related behaviours. A review of the literature reinforces this assumption in highlighting that Saudi Arabian community-level factors are likely to influence the health-related behaviours of participants. The Kingdom of Saudi Arabia is located in the Middle East between the Persian Gulf and the Red Sea and is one of the largest countries in that region (WHO, 2011b). Saudi Arabia has the largest reserve of petroleum in the world. This wealth of oil has led to massive improvement in socio-economic development in that country (Aboul-Enein, 2002; Tumulty, 2001a, 2001b). However, rapid economic and social development in recent decades in Saudi Arabia has been associated with increasingly sedentary behaviours and the adoption of a lifestyle congruent with industrialisation. The result has been an increase in risk factors for many chronic diseases, including cardiovascular disease (Sharawi, 2009; Shara, 2010; Al-Refaee & Al-Hazzaa, 2001). A review of the literature identified that the high prevalence of smoking (shisha) among women in Saudi Arabia is due to rapid and significant changes in lifestyle changes (Abdalla et al., 2007; Sharawi, 2009). Additionally, the eating behaviour of children and adults in Saudi Arabia has changed towards unhealthy food choices and Western fast food options, thus leading to a high prevalence of overweight and obesity in Saudi Arabia (Shara, 2010).

Physical inactivity has also been reported to be common in Saudi Arabia due to the lifestyle change and especially noted in women (Al-Hazzaa, 2004; Al-Nozha et al., 2007). It has been reported that physical inactivity among Saudi women is as high as 98% (Al-Nozha et al., 2007). The possible explanations for this result are that women have specific roles in the community, which create barriers for them in engaging in healthy behaviours (Shara, 2010). Such findings suggest that community programs that include intervention strategies to reduce the prevalence of CVD and CVD risk factors in Saudi Arabia may be required. Community-based CVD prevention programs in different cities have been successful in their goal to reduce the prevalence of CVD and CVD risk factors through changing patients' behaviours (Shea & Basch, 1990). These community programs include interventions such as community mobilisation, social marketing, school-based health education, and screening and referral education (Shea & Basch, 1990).

6.6.5 Public Policy Factors

The last level of influence in the McLeroy and colleagues (1988) Ecological Model of Health Behaviour is public policy. Current public policy and regulatory frameworks do not consistently promote positive health behaviours of the Saudi community in general and patients especially (Al-Nozha et al., 2009). An example in Saudi Arabia is tobacco control policies. In 2002, the Ministry of Health of Saudi Arabia adapted a policy to control tobacco in the two holiest places in Islam (Mecca and Medina) (Saloojee & Chaouki, 2007). This policy aimed to restrict smoking in these two cities and prohibit all commercial activities involving tobacco. However, although there is some tobacco restriction in these two cities, there is no close monitoring for enforcing this policy (Al-Mohamed & Amin, 2010). Further, there is no restriction on smoking behaviour in public places, no signs warning about the danger of smoking, or any penalties for smoking in public. The limitations of current public policies in relation to smoking behaviours highlights the importance of policy reform in areas such as quitting smoking to provide a policy environment where patients who experienced a cardiac event are encouraged to engage in healthy behaviours.

Additionally, in Saudi Arabia, there is a general lack of national policy and facilities that are suitable for people to get involved in physical activity (Al-Hazzaa, 2004b). Although the Ministry of Education established a new policy that allows physical education programs for children in schools, this policy was limited to private schools and was not extended to government schools where most children in the general population receive their education. Moreover, the absence of appropriate exercise facilities in Saudi Arabia, especially for women, can deter women from engaging in physical activity. The lack of national policy and facilities for reducing physical inactivity and promoting active living in Saudi Arabia can negatively influence the health-related behaviours of patients following a cardiac event.

There has also been a lack of national policy regarding healthy eating habits in Saudi Arabian communities (Al-Rethaiaa, Fahmy, & Al-Shwaiyat, 2010). It has been suggested that a national obesity and overweight prevention and control policy is necessary in Saudi Arabia. Such a policy should involve coordinated efforts at all levels in communities, including policies for dietary management, regular medical follow up for the target population, educational programs to promote healthy eating habits, and restrictions on fast food purchases (Al-Rethaiaa, Fahmy, & Al-Shwaiyat, 2010).

Theoretically, this study proposes that increasing public awareness about specific health issues and the prevention process is considered one important public policy activity (McLeroy et al., 1988). The study findings suggest that participants reported a lack of knowledge and awareness in all aspects of secondary prevention practice guidelines. More specifically, less than half of the participants were aware of the benefit of quitting smoking in reducing the risk of CVD. The findings also indicate that such a lack of knowledge was strongly associated with a negative attitude toward behavioural change. Therefore, improving patient knowledge of the CVD risk factors and their understanding of the prevention processes are important priorities for Saudi Arabia. Such improvements require a supportive public policy environment to ensure efforts to promote positive behaviour change at the individual level is effective.

6.7 CONCLUSION

In conclusion, the participants in this study demonstrated lack of knowledge and awareness in all aspects of the international guidelines for secondary prevention practices. Further, the health practices relevant to secondary prevention that were provided for the participants in this study were inconsistent with the international guidelines. Such lack of knowledge and lack of consistent practices were factors influencing health-related behaviour for participants in this study. The literature also confirmed that factors at interpersonal, community and public policy levels were also important influences on health-related behaviour for participants. In addition, the health-related quality of life of the study sample was negatively affected following a cardiac event. The following chapter will present the summary of findings, strengths and limitations of the study and the implications for future research and clinical practice.

Chapter 7: Conclusion

The purpose of Chapter 7 is to summarise the main findings from the study. A discussion of the strengths and limitations of the study is presented, followed by recommendations for future research and clinical practices.

7.1 SUMMARY OF FINDINGS

The overall purpose of the present study was to examine the health-related behaviour of Saudi people following a recent cardiac event, and to identify the factors that influence these behaviours. It has been noted that an understanding of the multi-level nature of influences on an individual's behaviour provides fundamental information that may help in developing appropriate plans and intervention strategies to change behaviours (McLeroy et al., 1988). Overall, findings from the current study make a significant contribution to existing knowledge and the understanding of factors at different levels that may influence cardiac patients' behaviour to participate in secondary prevention programs. Further, the study's findings make a contribution to addressing a gap in the literature that relates to the evaluation of the secondary prevention practices in Saudi Arabian health services.

Findings from the main study highlight the importance of including secondary cardiovascular prevention programs in this population. There was a high prevalence of CVD risk factors among the participants. The study findings reported the highest rate of smoking noted globally among the general population and further for cardiac patients. In addition, the majority of the participants in this study were either overweight or obese. Further, more than half of the participants had a history of hypertension and diabetes mellitus. Findings of the present study also identified that there were high rates of non-modifiable risk factors among the participants in the current study. The majority of the participants were male and reported having low education levels. These findings indicate that modifiable risk factors of CVD, including obesity and tobacco use and non-modifiable risk factors, such as male gender, and low level of education are associated with increasing rates of developing CVD among the Saudi population.

The present study also highlights the importance of developing an educational approach to increase knowledge and awareness regarding secondary prevention practices among participants in the current study with an aim to support behaviour change. There was limited knowledge and a lack of awareness in all aspects of the established international evidence-based guidelines for secondary prevention practices among the study's sample. In addition, misconceptions regarding correct dietary advice and exercise maintenance also were demonstrated among participants. In the current study, the lack of knowledge was associated with a negative attitude toward maintaining a healthy lifestyle.

Further, although the participants in this study demonstrated a high use of recommended evidence-based medications, lifestyle interventions have received less attention among this population group. While the findings from this study suggest that adherence to medication among this population is already high, it would be beneficial for health care professionals to emphasise that medication adherence is only one component of secondary prevention programs, which also involves other lifestyle behaviour, such as stopping smoking, exercising more and dietary modification in order to prevent a second cardiac event.

Findings from the present study identify that knowledge and attitudes of the current Saudi sample are a significant factor at the intrapersonal level that influences their health behaviours. The lack of knowledge is associated with poor motivation for modifying lifestyle and adopting of healthy behaviours. The present study suggests that a relative lack of knowledge about secondary prevention practices may be a key factor which contributes to poor compliance to lifestyle change after a cardiac event. In addition, this lack of knowledge likely leads to a lack of motivation which can act as a barrier to participation in seeking secondary prevention practices. Some demographic characteristics such as age, education level, and income are significant predictors associated with an individual's knowledge. However, in the present study health-related quality of life and smoking status are not important factors associated with patients' knowledge.

The study found that interpersonal relationships with different social networks could influence health-related behaviours. Social support is associated with greater adherence to health promoting behaviours. The study also highlighted the importance of support from and interaction with health care professionals to facilitate behavioural changes in patients. The lack of support and interaction with health care professionals is likely to negatively influence participants' engagement in secondary prevention practices.

Findings from this study identify inconsistencies between secondary prevention practices for CVD patients as applied in the current study's setting and those recommended by international guidelines for secondary prevention practices. The health practices that are provided for participants during hospitalisation, at follow-up and during ongoing prevention periods could be important factors influencing patients' healthy behaviours. Furthermore, findings from the current study identified that services and resources are also significant predictors to developing and maintaining healthy behaviour. Findings indicate that shifting cardiac patients toward healthier behaviour will require system support at the organisational level. For instance, practices that encourage patient toward healthy lifestyle change, such as supportive counselling are needed.

The study identified that the Saudi Arabian community influences the health-related behaviours of participants. Major lifestyle changes following the rapid economic development experienced in Saudi Arabia had a negative impact on the health and healthy behaviours of the population. The participants' sedentary behaviours and the adoption of a western lifestyle have been associated with an increase in the modifiable or behavioural risk factors for CVD. The present study also identified that there is a general absence of secondary prevention practices in public policy, law, and regulatory frameworks to protect the health of the Saudi community.

The present study also identified that study participants have a poor health-related quality of life after a cardiac event. Findings from this study highlight the importance of supportive services in the areas of physical, emotional and social well-being to improve patients' quality of life following a recent cardiac event.

Findings of the current study also highlight the importance of providing facilities for practicing physical activity and developing access to healthy food choices that help shift the patients' behaviours toward healthier lifestyles.

7.2 STRENGTHS OF THE STUDY

There are number of strengths of the current study. Firstly, to the researcher's knowledge, this is the first study conducted in Saudi Arabia which attempts to address the gap in the literature on secondary prevention practices, health-related behaviours, and the health-related quality of life for Saudi people following a recent cardiac event. The current study employs multiple sources of data to provide more comprehensive information and accurate assessment of the situation in Saudi Arabia for cardiac patients, specifically, the MacNew and WHO-PREMISE instruments. These instruments were examined for validity, reliability and feasibility in Phase One before they were used in the main study.

Secondly, Phase One of the present study makes several contributions to the cardiac disease prevention field in Saudi Arabia. Phase One of this study used the WHO-PREMISE instrument, which is a reliable and valid instrument, to identify patient knowledge and attitudes to participation in secondary prevention practices. This instrument was used in 2005 by the WHO project in three low-income and seven middle income countries (Mendis et al., 2005). The content validity and the feasibility of this instrument were confirmed in Phase One of the study. Phase One also resulted in the development of a record audit and structured interview instruments to evaluate the current practices in health services for cardiac patients following a recent cardiac event. Both instruments were developed from international guidelines of recommended secondary prevention practices. In addition, the structured interview was designed to provide additional data for assessing the level of secondary prevention practices. The validity and feasibility of the record audit and structured interview were also confirmed. These instruments provided the opportunity to examine the factors that influence health-related behaviour at the organisational level.

Phase One provided the Arabic version of the MacNew Heart Disease Health-related Quality of Life to assess and evaluate the quality of life of patients following a cardiac event. For this phase, 60 patients were used to evaluate the internal consistency, test-retest reliability, and criterion validity of the measure. The validation process of the MacNew instrument continued through phase two, where factors analysis was conducted with a large sample size. Most importantly, the reliability and validity of the Arabic version of the MacNew instrument have been confirmed. This Arabic version of the MacNew instrument will provide the opportunity for future research to evaluate treatments after cardiac events such as cardiac rehabilitation, percutaneous coronary intervention and coronary bypass surgery.

A major strength of this research is the comprehensive evaluation of the multiple levels of factors that influence participant health behaviour. This comprehensive approach has enabled a deeper understanding of the relative contribution of multiple intrapersonal, interpersonal, organisational, community and policy levels factors, thus providing direction for interventions at multiple levels.

Another strength of the study was the sample size, which was sufficient for a factor analysis of the MacNew Heart Disease Health-related Quality of Life instrument, thus providing additional information about the construct validity and reliability of this tool.

7.3 LIMITATIONS OF THE STUDY

The findings of the current study support the Ecological Model of Health Behaviour in identifying how factors at different levels can influence participants' behavioural change. To enable an in-depth understanding of some levels of the ecological model within the scope of a PhD, the present study did not measure all levels in depth, including interpersonal, community and public policy. For instance, it has been argued that an individual's behaviour may be influenced by social norms or environmental changes that are created by policy decisions, rather than just the beliefs of the individual, and these levels may have more influence on the behaviour of an individual (McLeroy et al., 1988). The application of the theoretical framework developed for this study was limited by measuring factors at intrapersonal and organisational levels only, without examining the interaction across levels to identify which of the possible interactions are most important. According to McLeroy and colleagues (1988), the interaction across levels can determine the variables from different levels that work together in influencing behaviours and result in a high level of behavioural change. Identifying and understanding the interaction across levels is a challenge for research as it is difficult to determine which of the possible interactions are most important (McLeroy et al., 1988). To overcome these limitations, some attempt has been made in this study to draw on existing literature to enable preliminary discussion of what is known about various policy and system related factors that were not directly measured in this study. It is acknowledge, however, that more detailed policy analysis and empirical studies are required to provide an in-depth examination of these levels of influences, and the interaction between all levels of influence.

Another limitation of the study is that recruitment occurred in one hospital setting, which affects the generalisability of results. The results may not reflect the secondary prevention practices at other hospitals in Saudi Arabia. Further, this study used a convenience sampling strategy, which may also affect the generalisability of results. Furthermore, the sample size for both Phase One and Phase two of the present study was not calculated based on a statistical formula. In Phase One, the number of participants was determined by the time available to complete this phase. In Phase two, the sample size was calculated to enable factor analysis of the MacNew Heart Disease Health-related Quality of Life instrument. Given the multivariate nature of the study questions, more work is required to ensure large population based studies are conducted that enable more sophisticated statistical testing of relationships of interest. The current study developed the audit tool which was adapted from international guidelines. However, this tool needs to be tested on a larger sample so it can be better validated for use in future international studies. The study used cross-sectional design without a follow up. This study thus estimates the knowledge and attitude of patients at one point in time only, despite the fact that knowledge and attitudes could change over time. Additionally, the assessment of quality of life was undertaken at only one time-point for each patient. Although changing quality of life factors after treatment are well recognised (Höfer et al., 2008), it was not feasible to take these into consideration when assessing quality of life in the current study.

Another limitation of the current study was the potential recall bias related to the use of self-reported data. To minimise this bias, the present study design collected data via self-report, interview and audit of medical record to draw on multiple sources of data.

7.3.1 Implications for Future Studies

This study has identified factors that influence participants' behaviours at two levels (intrapersonal and organisation). Further research that includes all levels of analysis is required to clarify the contribution of variables at these different levels. A more comprehensive analysis would help in development of more comprehensive interventions that are likely to have greater impact. In addition, further exploration of the interaction across these different levels to identify which interactions are the most important to target future interventions is recommended.

Results from this study revealed a poor level of health-related quality of life for the participants' post-cardiac events. Further qualitative study is recommended to add more to the knowledge of understanding about how quality of life is affected after cardiac events to assist in the development of secondary prevention interventions. Such qualitative studies may identify the relationship between patients' knowledge and health-related quality of life.

In order to increase the generalisability of the study findings, selection of random sample of patients from all Saudi hospitals is recommended for future study. Moreover, a longitudinal study which examines patients' knowledge and attitudes and the actual secondary prevention practices would make a greater contribution to understanding influencing factors and the relationship between these factors, and whether interventions based on these factors produce actual behavioural change.

Finally, this study identified conflicting relationships between patients' knowledge of medications and attitude toward adherence to these medications. There was a high level of medication adherence among participants and poor knowledge about these medications. Further research that examines the relationships between these variables is recommended.

7.3.2 Implications for Clinical Practice

McLeroy et al.'s (1988) Ecological Model for Health Behaviour was applied to the present study to understand influences on health behaviours at different levels, thereby guiding interventions for health behavioural change at these levels. Results from this study on the factors that influence behaviours at the intrapersonal level recommend that the educational approach must be formalised and acknowledged as an official part of Saudi Arabian health care system. The education approach should be tailored to patient characteristics and target patients with low socio-economic status. Furthermore, these education efforts should be focused on improving patients' knowledge and attitude toward secondary prevention practices, including healthy diet and regular exercise. Promoting public awareness about diet and physical activity through health promotion campaigns, and providing education and information through mass media are also recommended. Increased community awareness of the benefits of cardiac rehabilitation programs is also needed.

At the organisational level, findings from the present study recommend that changes in health care practices are necessary for the adoption, implementation and support of long-term behavioural changes among individuals. Development of flexible secondary prevention services that are tailored to the patients' needs and are culturally competent are recommended. Strategies for secondary prevention that are introduced and have been successful in other countries, such as home visitation and telephone support, and the development of self-education materials and a combination of these services need to be implemented. In addition, it is necessary to promote and support care provision for cardiac patients by multidisciplinary provider teams, including physicians, nurses, dieticians, clinical health psychologists, exercise specialists, social workers and health educators.

Further, managing CVD risk factors in primary care and providing facilities for management of these factors is needed. For instance, the development and implementation of national guidelines on tobacco use, physical activity and diet for health are required. Medical communities and health care professionals should promote health and healthy behaviours by providing their patients with routine assessment and counselling. Provision of counselling facilities and care for cardiac patients to manage CVD risk factors is desirable. In addition, more suitable policies for tobacco control, physical activity and healthy dietary behaviours need to be enforced. This policy should encourage an active lifestyle and discourage sedentary living habits among the population. Educating children about healthy behaviours in schools is necessary to help them develop the knowledge and attitudes required to adopt and maintain healthy lifestyles. Promoting physical activity through creating facilities for sport and walk for general population and especially for women is also needed. A more supportive environment and communities are needed to enable people to be more physically active.

7.4 CONCLUSION

In conclusion, the importance of secondary prevention practices, educational approaches and supportive services have been highlighted by this study. As one of the first studies to examine the health-related behaviour of Saudi people following a recent cardiac event, this study identified factors that influence their behaviours. In particular, participants' knowledge and attitude toward participation in secondary prevention practices were significant factors at the intrapersonal level that influence their behaviours. Further, health care services and resources in the present study were also significant factors at the organisational level that influenced patients' behaviours. In addition, factors at the interpersonal, community and public policy levels also played significant roles in influencing the lifestyles and behaviours of the participants. Findings from the present study can be used to design interventions that target factors at each of these levels. Importantly, this study has highlighted the importance of taking a more holistic approach to promoting participation in secondary prevention practices.

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Appendices

APPENDIX A: THE WHO-PREMISE QUESTIONNAIRE

The World Health Organization WHO-PREMISE Study.
(Prevention of REcurrence of Myocardial Infarction and StrokE Study).

Patient Identification	
Patient ID [ ]	File No. [ ]

1. Subject initials	☐☐☐
2. Age (What is your age on the last birthday?) Give estimates if unsure	☐☐
3. Sex	Male [1]☐ Female [2]☐
4. Income level (To which of these categories does your total family income fall*)? * manual gives different income levels	_________per month [1] ☐ _________per month [2] ☐ _________per month [3] ☐ _________per month [4] ☐ _________per month [5] ☐ _________per month [6] ☐
5. Level of education (What is your level of education)?	Unable to read [1] ☐ No formal education [2] ☐ Up to primary school [3] ☐ Up to high/technical school [4] ☐ University/College [5] ☐

1

Pharmacological Agents

	6	7	8	9	10	11
Drug types	Please mark "Yes" or "No" Which of the listed drugs has your doctor advised you to take in the past?	During the past four weeks, have you taken those drugs marked in Q6 as advised?	Please state reason why you have not been taking the drugs you marked "No" in Q 6, regularly.	Did the doctor tell you how long you should take the drug?	Do you have to purchase the drugs at your own cost or are they supplied free to you?	If the drugs are supplied free or at only part of the cost, from where do you get them ? ***(Mark question only if either the [supplied free] or [subsidized] box is checked in Q10)***
Aspirin	Yes[1] ❑ No[2] ❑ Don't know [3] ❑	Yes[1] ❑ No[2] ❑	Cannot afford the cost [1] ❑ Not easily available [2] ❑ I don't feel the need [3] ❑ I experienced side effects [4] ❑	Yes [1] ❑ No [2] ❑ Can't remember [3] ❑	Supplied free [1] ❑ Subsidised [2] ❑ Purchased at own cost [3] ❑	Government clinic [1] ❑ Employers health service [2] ❑ Health insurance [3] ❑
Beta Blockers	Yes[1] ❑ No[2] ❑ Don't know [3] ❑	Yes[1] ❑ No[2] ❑	Cannot afford the cost [1] ❑ Not easily available [2] ❑ I don't feel the need [3] ❑ I experienced side effects [4] ❑	Yes [1] ❑ No [2] ❑ Can't remember [3] ❑	Supplied free [1] ❑ Subsidised [2] ❑ Purchased at own cost [3] ❑	Government clinic [1] ❑ Employers health service [2] ❑ Health insurance [3] ❑
ACE Inhibitors	Yes[1] ❑ No[2] ❑ Don't know [3] ❑	Yes[1] ❑ No[2] ❑	Cannot afford the cost [1] ❑ Not easily available [2] ❑ I don't feel the need [3] ❑ I experienced side effects [4] ❑	Yes [1] ❑ No [2] ❑ Can't remember [3] ❑	Supplied free [1] ❑ Subsidised [2] ❑ Purchased at own cost [3] ❑	Government clinic [1] ❑ Employers health service [2] ❑ Health insurance [3] ❑
Statins	Yes[1] ❑ No[2] ❑ Don't know [3] ❑	Yes[1] ❑ No[2] ❑	Cannot afford the cost [1] ❑ Not easily available [2] ❑ I don't feel the need [3] ❑ I experienced side effects [4] ❑	Yes [1] ❑ No [2] ❑ Can't remember [3] ❑	Supplied free [1] ❑ Subsidised [2] ❑ Purchased at own cost [3] ❑	Government clinic [1] ❑ Employers health service [2] ❑ Health insurance [3] ❑

	Aspirin 12	Beta Blockers 13	ACE Inhibitors 14	Statins 15
Has your doctor told you that the drugs (which you marked in Q 6) may have side effects?	Yes [1] ❑ No [2] ❑ Can't remember [3] ❑	Yes [1] ❑ No [2] ❑ Can't remember [3] ❑	Yes [1] ❑ No [2] ❑ Can't remember [3] ❑	Yes [1] ❑ No [2] ❑ Can't remember [3] ❑
25. At your last visit, did the doctor or other health workers ask you if you are taking your medicines regularly?				Yes [1] ❑ No [2] ❑ Can't remember [3] ❑

3

Lifestyle Factors

Life style factors	16 **Do you know if the following can be important in preventing heart attack and stroke?**	17 **From where did you obtain this information?** *(You may mark more than one option please)*	18 **Have you ever been advised by your doctor/health worker on:**	19 **Whenever you go for follow up does the doctor/ nurse or health worker ask you if you follow the lifestyle advice instructions on:**
Heart-healthy Diet **(diet rich in fruits and vegetables, cereals and low in fat and salt)**	Yes [1] ❑ No [2] ❑ Don't know [3] ❑	Doctor [1] ❑ Nurse/Health Workers [2] ❑ Lay acquaintance [3] ❑ TV/Media [4] ❑	Heart Healthy diet? Yes [1] ❑ No [2] ❑	Heart Healthy diet? Yes [1] ❑ No [2] ❑
Quit smoking	Yes [1] ❑ No [2] ❑ Don't know [3] ❑	Doctor [1] ❑ Nurse/Health Workers [2] ❑ Lay acquaintance [3] ❑ TV/Media [4] ❑	*Quit smoking?* Yes [1] ❑ No [2] ❑	Quit smoking? Yes [1] ❑ No [2] ❑
Physical activity (30 minutes per day of brisk walking, gardening, cycling, swimming)	Yes [1] ❑ No [2] ❑ Don't know [3] ❑	Doctor [1] ❑ Nurse/Health Workers [2] ❑ Lay acquaintance [3] ❑ TV/Media [4] ❑	*Physical activity?* Yes [1] ❑ No [2] ❑	*Physical activity?* Yes [1] ❑ No [2] ❑

4

Dietary factors

Do you know that you should:

20	21	22	23	24
eat less oily and fatty foods?	eat less salt in your food?	eat less red meat like mutton, beef and pork?	eat more fruit and vegetables in your daily diet?	include more fish in you diet ?
Yes [1] ❑ No [2] ❑	Yes [1] ❑ No [2] ❑	Yes [1] ❑ No [2] ❑	Yes [1] ❑ No [2] ❑	Yes [1] ❑ No [2] ❑

25. Do you have any difficulty in following the diet as advised?	Yes [1] ❑ No [2] ❑

If the response to question 25 is, 'Yes' proceed to the next question. If the response is 'No', skip the next question and proceed to question 36.

26. What difficulties do you have in following the diet as advised? *(You may mark one or more options)*	Lack of availability [1] ❑ Cannot afford [2] ❑ Others [3] ❑

5

Tobacco use:	
27. Do you presently smoke at least 1 cigarette per day (beedies/cigars/hukka)?	Yes [1] ❑ No [2] ❑
28. Do you presently chew tobacco leaf?	Yes [1] ❑ No [2] ❑
29. If you do not currently smoke, did you use tobacco previously?	Yes [1] ❑ No [2] ❑
30. When did you stop tobacco use?	☐☐ ☐☐ YY MM

Exercise	
31.Are you engaged in job related physical activities (such as in house work, construction sites, farming, manual labour etc) every day?	Yes [1] ❑ No [2] ❑
32. Are you engaged in at least 30 minutes of moderate physical activity (brisk walking, dancing, gardening, jogging, cycling, farming, digging swimming, sports activity) daily?	Yes [1] ❑ No [2] ❑
33. If you are not physically active can you tell me the reason(s)? *(Mark one or more options please)*	Insufficient time [1] ❑ Physical disability [2] ❑ Not good for me [3] ❑ Facilities not conducive [4] ❑ Others [5] ❑ Please specify __________

6

CARDIOVASCULAR RISK FACTORS			
	34	35	36
	Have you had the following checked in the last year?	Do you know if you are suffering from the following?	Do you know that if the following are well controlled, the chances of your having another heart or stroke will be reduced?
Blood pressure	Yes [1] ❑ No [2] ❑	High blood pressure (Hypertension) Yes [1] ❑ No [2] ❑	Yes [1] ❑ No [2] ❑
Blood sugar	Yes [1] ❑ No [2] ❑	High blood sugar level (diabetes) Yes [1] ❑ No [2] ❑	Yes [1] ❑ No [2] ❑
Cholesterol (lipids)	Yes [1] ❑ No [2] ❑	High blood cholesterol levels (hypercholesterolemia) Yes [1] ❑ No [2] ❑	Yes [1] ❑ No [2] ❑

APPENDIX B: PERMISSION TO BORROW THE WHO-PREMISE QUESTIONNAIRE

Re: PREMISE Questionnaire

Mendis, Shanthi P.B. (mendiss@who.int)
2/23/2011

To: Hassen.Ghannem@rns.tn, hawazen_rawas@hotmail.com

Dear Hawazen

Please go ahead and use it and acknowledge that it is WHO PREMISE questionnaire

Shanthi Mendis

APPENDIX C: AUDIT TOOL

Patient ID [ ] The Second chance Project

Audit tool criteria for evaluating secondary prevention services for patients following a cardiac event. Adapted from the National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association

Audit Tool Criteria

Demographics

File No. [ ] [ ] [ ] [ ] [ ] [ ]

DOB [ ]

Sex: ○ Male ○ Female

Cardiac event:

When event happened:

Country of Birth

Address:

Family History:

Partner/social Network:

○ Yes ○ No

Marital Status:
- ○ Single
- ○ Married
- ○ Divorce
- ○ Widow

Smoking Status:
- ○ Current
- ○ Give up
- ○ Never smoked
- ○ Unknown/ undocumented

Patient ID [ ]   The Second chance Project

In-Patient (During initial admission following a cardiac event)

Medical History	Physical Examination Most recent
Medical history taken ○ Yes ○ No	Height (cm) [ ]
Hypertension ○ Yes ○ No	Weight (kg) [ ]
Diabetes ○ Yes ○ No	BMI [ ]
CHD ○ Yes ○ No	Blood Pressure [ ] [ ]
Heart failure ○ Yes ○ No	Pulse (bpm) [ ]
Stroke ○ Yes ○ No	Respiratory rate (breath/min) [ ]
ACS (angina pectoris, MI) ○ Yes ○ No	Temperature [ ]
Peripheral arterial disease ○ Yes ○ No	**Biochemistry** Most recent within 12 months
Cerebral vascular disease ○ Yes ○ No	Total cholesterol [ ]
Kidney disease ○ Yes ○ No	HDL [ ]
Cardiac surgery ○ Yes ○ No	LDL [ ]
CABAG or CAGS ○ Yes ○ No	Triglycerides [ ]
Valve repair/replacement ○ Yes ○ No	Sodium [ ]
	Plasma Blood Glucose [ ]
	HBA1c [ ]
	Haemoglobin [ ]
	Creatinine [ ]
	Troponin elevated glucose [ ]
	CRP-c reactive protein [ ]

QUT Queensland University of Technology   Page 2

Patient ID [ ] The Second chance Project

Clinical Examination	Identify Risk Factors
Electrocardiograms at rest and during exercise ○ Yes ○ No Exercise stress test ○ Yes ○ No Transoesphageal echocardiogram (TOE) ○ Yes ○ No Chest-x-ray ○ Yes ○ No Radionuclide Scan ○ Yes ○ No Coronary angiography: ○ Yes ○ No Echocardiogram: ○ Yes ○ No	Monitoring weight ○ Yes ○ No Measuring Physical activity ○ Yes ○ No Measuring Smoking ○ Yes ○ No Measuring Nutrition ○ Yes ○ No **Mobilising Program** Offer mobilising program to return patient to an active level ○ Yes ○ No Patient assessment of progress ○ Yes ○ No Report any symptom during activity e.g. chest pain ○ Yes ○ No

Discharge Plan

Clear and complementary written discharge plan

○ Yes ○No

Summarized goal and strategies to achieved it

○ Yes ○ No

Referral to out-patient cardiac rehabilitation and promotion of its benefits

○ Yes ○ No

Communication with specialist, general practitioner and/or other health professionals as determined by assessment of individual need and confirmation of follow-up appointments

○ Yes ○ No

Patient information about medications

○ Yes ○ No

A specific plan for management of symptoms at home including provision of suitable written information about the education topics covered (dyspnoea, chest pain, palpitation, cyanosis)

○ Yes ○ No

Contact details for local community resources including patient support groups

○ Yes ○ No

Outpatient (follow-up period)

(From discharge until 6 months following a cardiac event)

Assessment, review and follow-up

Individual assessment and regular review, which includes attention to physical, psychological and social parameters
○ Yes ○ No

Referral to appropriate health professionals and services as required
○ Yes ○ No

Discharge or summary letters sent to the GP, cardiologist and other primary care provider as nominated by the patient
○ Yes ○ No

Physical Activity

Written advice of a physical activity program for patient:
○ Yes ○ No

Program involves a minimum of six activity sessions, weekly or twice weekly (documented in a physical activity sheet)
○ Yes ○ No

Written guidelines for resumption of daily activities, including home walking program
○ Yes ○ No

Physical activity program review at each contact
○ Yes ○ No

Instructions in self-monitoring during physical activity
○ Yes ○ No

Referral Plan

Referral to ongoing cardiovascular prevention program (if applicable)
○ Yes ○No

Ongoing Prevention, up to 6 months from initial admission

(Referral to community services / other hospital)

Ongoing assessment and management

Does the patient receive the following assessment in the community services as an ongoing prevention:

Smoking, nutrition, alcohol, physical activity and weight management including identification of individual goals
○ Yes ○ No

Biomedical risk factors (lipid, blood pressure, diabetes)
○ Yes ○ No

Medication (antiplatelets, ACE inhibitors, Beta-blockers, statins, anticoagulants)
○ Yes ○ No

Psychosocial risk factors (depression, anxiety)
○ Yes ○ No

APPENDIX D: STRUCTURED INTERVIEW

Patient ID

Structured interview for evaluation of secondary prevention services for patients following a cardiac event adapted from the National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association

Interview Questions

The following questions are to evaluate secondary prevention practices for cardiac patients during the initial admission to hospital for a cardiac event:

1. **Basic Information and Education:**

Did you receive explanation and information on:

a. Cardiac condition, treatment, and procedures
○ Yes ○ No

b. Psychological implication of illness (emotions)
○ Yes ○ No

c. Social factors (family and personal relationships, social support/isolation)
○ Yes ○ No

d. Medications
○ Yes ○ No

e. Identification of risk factors
○ Yes ○ No

f. How to modify the risk factors
○ Yes ○ No

g. Wound care (if applicable)
○ Yes ○ No ○ Not applicable

h. Resumption of physical Activity
○ Yes ○ No

i. Resumption of sexual activity
○ Yes ○ No

j. Resumption of daily living activities (driving)
○ Yes ○ No

k. Resumption of daily living activities (Return to work)
○ Yes ○ No

l. Management of chest pain or other cardiac symptoms
○ Yes ○ No

1

Patient ID [ ]

Structured interview for evaluation of secondary prevention services for patients following a cardiac event adapted from the National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association

If yes to any of the above, please describe what information/education was provided?

____

____

Did this information/education meet your needs?

○ Yes ○ No

Why/Why not?

____

____

Patient ID [ ]

Structured interview for evaluation of secondary prevention services for patients following a cardiac event adapted from the National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association

2. **Supportive Counselling:**

Did you receive supportive counselling particularly in following areas:

a. Individual counselling about health behaviours to reduce risk of cardiac events
○ Yes ○ No

b. Nutritional counselling
○ Yes ○ No

c. Stress- reduction
○ Yes ○ No

d. Diabetes management
○ Yes ○ No

e. Physical activity
○ Yes ○ No

f. Exercise training
○ Yes ○ No

g. Management of emotions
○ Yes ○ No

h. Management of social relationships
○ Yes ○ No

If yes to any of the above, please describe what support was provided?

___

___

Did these support practices meet your needs?
○ Yes ○ No

Why/Why not?

___

___

3

Patient ID

Structured interview for evaluation of secondary prevention services for patients following a cardiac event adapted from the National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association

The following questions are to evaluate secondary prevention practices for cardiac patients following discharge until 6 months following a cardiac event (outpatient):

1. **Education, discussion and counselling:**

Did you receive education at the follow-up visit about:

a. Basic anatomy and physiology of the heart
○ Yes ○ No

b. Effect of heart disease (atherosclerosis)
○ Yes ○ No

c. The healing process, recovery and prognosis
○ Yes ○ No

d. Risk factors for heart disease and their modification for secondary prevention:

1. Smoking cessation
○ Yes ○ No

2. Physical activity
○ Yes ○ No

3. Healthy eating choices
○ Yes ○ No

4. Control of blood lipids
○ Yes ○ No

5. Control of weight
○ Yes ○ No

6. Control of blood pressure and diabetes
○ Yes ○ No

e. Skill for changing health behaviours
○ Yes ○ No

f. Resumption of physical activity
○ Yes ○ No

g. Resumption of sexual activity
○ Yes ○ No

h. Resumption of daily activities (driving)
○ Yes ○ No

i. Resumption of daily activities (return to work)
○ Yes ○ No

j. Psychological issues (emotions)
○ Yes ○ No

k. Skill development to enable behaviour change and maintenance
○ Yes ○ No

4

Patient ID

Structured interview for evaluation of secondary prevention services for patients following a cardiac event adapted from the National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association

l. Social factors (family and person relationships, social support/isolation)
○ Yes ○ No

m. Management of chest pain or other cardiac symptoms
○ Yes ○ No

n. Medications
○ Yes ○ No

o. Investigations and procedures
○ Yes ○ No

p. The importance of follow-up by specialist, GP or other primary care provider
○ Yes ○ No

q. Communicating with specialists, general practitioners and/or other health professionals for follow-up
○ Yes ○ No

If yes to any of the above, please describe what information/education was provided?

____
____

Did this information/education meet your needs?
○ Yes ○ No

Why/Why not?
____
____

5

Patient ID

Structured interview for evaluation of secondary prevention services for patients following a cardiac event adapted from the National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association

The following questions are to evaluate ongoing prevention for cardiac patients (up to 6 months following initial cardiac event)

(Referral to community services/ other hospital):

1. **Behaviour change:**

Supported for maintenance of behaviour change through:

a. Communication with treating doctor and or primary care provider
○Yes ○No

b. Heart support and/or other community based group
○Yes ○ No

c. Ongoing access to education as required
○Yes ○No

d. Home or community-based walking and/or other physical activity program
○Yes ○ No

e. Individual assessment and referral to appropriate health professionals as required
○Yes ○ No

f. Telephone follow-up
○Yes ○No

g. Ongoing care in general practice setting
○Yes ○No

If yes to any of the above, please describe what support was provided?
____
____

Did these support practices meet your needs?
○Yes ○No

Why/Why not?
____
____

6

Patient ID

Structured interview for evaluation of secondary prevention services for patients following a cardiac event adapted from the National Heart Foundation of Australia & Australian Cardiac Rehabilitation Association

2. Goals of Medical Therapy:

Did you receive education support about the goals of your medical therapy including:

a. Medication
○Yes ○ No

b. Coordinated program of chronic disease management including ongoing individual medical care
○Yes ○ No

c. Monitoring of risk factors (lipid, BP, etc.)
○Yes ○No

If yes to any of the above, please describe what information/support was provided?

Did this information/support meet your needs?
○Yes ○No

Why/Why not?

3. Physical Activity:

Are you involved in regular physical activity program?
○Yes ○No

If yes , please describe?

Did this information/support meet your needs?
○Yes ○No

Why/Why not?

APPENDIX E: MACNEW HEART DISEASE HEALTH-RELATED QUALITY OF LIFE QUESTIONNAIRE

macnew.org
HEALTH-RELATED QUALITY OF LIFE INSTRUMENT

We would now like to ask you some questions about how you have been feeling **DURING THE LAST 2 WEEKS**.

Please check the box ❑ that matches your answer

1. In general, how much of the time during the last 2 weeks have you felt frustrated, impatient or angry?

   1 ❑ ALL OF THE TIME
   2 ❑ MOST OF THE TIME
   3 ❑ A GOOD BIT OF THE TIME
   4 ❑ SOME OF THE TIME
   5 ❑ A LITTLE OF THE TIME
   6 ❑ HARDLY ANY OF THE TIME
   7 ❑ NONE OF THE TIME

2. How often during the last 2 weeks have you felt worthless or inadequate?

   1 ❑ ALL OF THE TIME
   2 ❑ MOST OF THE TIME
   3 ❑ A GOOD BIT OF THE TIME
   4 ❑ SOME OF THE TIME
   5 ❑ A LITTLE OF THE TIME
   6 ❑ HARDLY ANY OF THE TIME
   7 ❑ NONE OF THE TIME

3. In the last 2 weeks, how much of the time did you feel very confident and sure that you could deal with your heart problem?

   1 ❑ NONE OF THE TIME
   2 ❑ A LITTLE OF THE TIME
   3 ❑ SOME OF THE TIME
   4 ❑ A GOOD BIT OF THE TIME
   5 ❑ MOST OF THE TIME
   6 ❑ ALMOST ALL OF THE TIME
   7 ❑ ALL OF THE TIME

4. In general how much of the time did you feel discouraged or down in the dumps during the last 2 weeks?

1 ❑ ALL OF THE TIME
2 ❑ MOST OF THE TIME
3 ❑ A GOOD BIT OF THE TIME
4 ❑ SOME OF THE TIME
5 ❑ A LITTLE OF THE TIME
6 ❑ HARDLY ANY OF THE TIME
7 ❑ NONE OF THE TIME

5. How much of the time during the past 2 weeks did you feel relaxed and free of tension?

1 ❑ NONE OF THE TIME
2 ❑ A LITTLE OF THE TIME
3 ❑ SOME OF THE TIME
4 ❑ A GOOD BIT OF THE TIME
5 ❑ MOST OF THE TIME
6 ❑ ALMOST ALL OF THE TIME
7 ❑ ALL OF THE TIME

6. How often during the last 2 weeks have you felt worn out or low in energy?

1 ❑ ALL OF THE TIME
2 ❑ MOST OF THE TIME
3 ❑ A GOOD BIT OF THE TIME
4 ❑ SOME OF THE TIME
5 ❑ A LITTLE OF THE TIME
6 ❑ HARDLY ANY OF THE TIME
7 ❑ NONE OF THE TIME

7. How happy, satisfied, or pleased have you been with your personal life during the last 2 weeks?

1 ❑ VERY DISSATISFIED, UNHAPPY MOST OF THE TIME
2 ❑ GENERALLY DISSATISFIED, UNHAPPY
3 ❑ SOMEWHAT DISSATISFIED, UNHAPPY
4 ❑ GENERALLY SATISFIED, PLEASED
5 ❑ HAPPY MOST OF THE TIME
6 ❑ VERY HAPPY MOST OF THE TIME
7 ❑ EXTREMELY HAPPY, COULD NOT HAVE BEEN MORE SATISFIED OR PLEASED

8. In general, how often during the last 2 weeks have you felt restless, or as if you were having difficulty trying to calm down?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

9. How much shortness of breath have you experienced during the last 2 weeks while doing your day-to-day physical activities?

1 ☐ EXTREME SHORTNESS OF BREATH
2 ☐ VERY SHORT OF BREATH
3 ☐ QUITE A BIT OF SHORTNESS OF BREATH
4 ☐ MODERATE SHORTNESS OF BREATH
5 ☐ SOME SHORTNESS OF BREATH
6 ☐ A LITTLE SHORTNESS OF BREATH
7 ☐ NO SHORTNESS OF BREATH

10. How often during the last 2 weeks have you felt tearful or like crying?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

11. How often during the last 2 weeks have you felt as if you are more dependent than you were before your heart problem?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

12. How often during the last 2 weeks have you felt you were unable to do your usual social activities or social activities with your family?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

13. How often during the last 2 weeks have you felt as if others no longer have the same confidence in you as they did before your heart problem?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

14. How often during the last 2 weeks have you experienced chest pain while doing your day-to-day activities?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

15. How often during the last 2 weeks have you felt unsure of yourself or lacking in self-confidence?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

16. How often during the last 2 weeks have you been bothered by aching or tired legs?

1 ❑ ALL OF THE TIME
2 ❑ MOST OF THE TIME
3 ❑ A GOOD BIT OF THE TIME
4 ❑ SOME OF THE TIME
5 ❑ A LITTLE OF THE TIME
6 ❑ HARDLY ANY OF THE TIME
7 ❑ NONE OF THE TIME

17. During the last 2 weeks, how much have you been limited in doing sports or exercise as a result of your heart problem?

1 ❑ EXTREMELY LIMITED
2 ❑ VERY LIMITED
3 ❑ LIMITED QUITE A BIT
4 ❑ MODERATELY LIMITED
5 ❑ SOMEWHAT LIMITED
6 ❑ LIMITED A LITTLE
7 ❑ NOT LIMITED AT ALL

18. How often during the last 2 weeks have you felt apprehensive or frightened?

1 ❑ ALL OF THE TIME
2 ❑ MOST OF THE TIME
3 ❑ A GOOD BIT OF THE TIME
4 ❑ SOME OF THE TIME
5 ❑ A LITTLE OF THE TIME
6 ❑ HARDLY ANY OF THE TIME
7 ❑ NONE OF THE TIME

19. How often during the last 2 weeks have you felt dizzy or lightheaded?

1 ❑ ALL OF THE TIME
2 ❑ MOST OF THE TIME
3 ❑ A GOOD BIT OF THE TIME
4 ❑ SOME OF THE TIME
5 ❑ A LITTLE OF THE TIME
6 ❑ HARDLY ANY OF THE TIME
7 ❑ NONE OF THE TIME

20. In general, during the last 2 weeks how much have you been restricted or limited as a result of your heart problem?

1 ☐ EXTREMELY LIMITED
2 ☐ VERY LIMITED
3 ☐ LIMITED QUITE A BIT
4 ☐ MODERATELY LIMITED
5 ☐ SOMEWHAT LIMITED
6 ☐ LIMITED A LITTLE
7 ☐ NOT LIMITED AT ALL

21. How often during the last 2 weeks have you felt unsure as to how much exercise or physical activity you should be doing?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

22. How often during the last 2 weeks have you felt as if your family is being over-protective toward you?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

23. How often during the past 2 weeks have you felt as if you were a burden on others?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

24. How often during the past 2 weeks have you felt excluded from doing things with other people because of your heart problem?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

25. How often during the past 2 weeks have you felt unable to socialize because of your heart problem?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME

26. In general, during the last 2 weeks how much have you been physically restricted or limited as a result of your heart problem?

1 ☐ EXTREMELY LIMITED
2 ☐ VERY LIMITED
3 ☐ LIMITED QUITE A BIT
4 ☐ MODERATELY LIMITED
5 ☐ SOMEWHAT LIMITED
6 ☐ LIMITED A LITTLE
7 ☐ NOT LIMITED AT ALL

27. How often during the last 2 weeks have you felt your heart problem limited or interfered with sexual intercourse?

1 ☐ ALL OF THE TIME
2 ☐ MOST OF THE TIME
3 ☐ A GOOD BIT OF THE TIME
4 ☐ SOME OF THE TIME
5 ☐ A LITTLE OF THE TIME
6 ☐ HARDLY ANY OF THE TIME
7 ☐ NONE OF THE TIME
☐ NOT APPLICABLE

That's the end. Thanks very much for answering the questions.
[Version: November 2003]

Patient ID ☐ File No. ☐

نود ان نسألك الآن بعض الأسئله حول شعورك **<u>خلال الأسبوعين الماضيين:</u>**

من فضلك اختر المربع ☐ اللذي يتناسب مع اجابتك

1. بشكل عام كم من الوقت في الأسبوعين الماضيين أحسست بأحباط ، عدم الصبر أو الغضب؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

2. كم مره خلال الأسبوعين الماضيين شعرت بأنك عديم القيمة ؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

3. خلال الأسبوعين الماضيين, كم من الوقت شعرت بأنك واثق ومتأكد بانك تستطيع التعامل مع مشكلة قلبك؟

☐1 لاشئ من الوقت
☐2 قليلاً من الوقت
☐3 بعض الوقت
☐4 قدراً جيداً من الوقت
☐5 معظم الوقت
☐6 تقريباً طوال الوقت
☐7 طوال الوقت

1

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4. بشكل عام , كم من الوقت شعرت بأنك محبط او مكتئب خلال الأسبوعين الماضيين؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

5. كم من الوقت خلال الأسبوعين الماضيين شعرت بالراحه وعدم التوتر ؟

☐1 لاشئ من الوقت
☐2 قليلاً من الوقت
☐3 بعض الوقت
☐4 قدراً جيداً من الوقت
☐5 معظم الوقت
☐6 تقريباً طوال الوقت
☐7 طوال الوقت

6. كم من المرات أحسست في الاسبوعين الماضيين بتعب أو طاقتك قليله؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

2

Patient ID ☐ **File No.** ☐

7. ماهو مقدار سعادتك ، رضاك ، سرورك مع حياتك الخاصة في الأسبوعين الماضيين ؟

- ☐ 1 غير راضي جدا ، غير سعيد معظم الوقت
- ☐ 2 بشكل عام غير راضي ، غير سعيد
- ☐ 3 إلى حد ما غير راضي ، غير سعيد
- ☐ 4 بشكل عام راضي و مسرور
- ☐ 5 سعيد في معظم الوقت
- ☐ 6 سعيد جداً في معظم الوقت
- ☐ 7 سعيد للغاية, لا يوجد سعادة أكثر من ذالك

8. بشكل عام كم من الوقت في الأسبوعين الماضيين أحسست بأنك غير مرتاح أو أحسست بصعوبة حتى تهدئ نفسك ؟

- ☐ 1 طوال الوقت
- ☐ 2 معظم الوقت
- ☐ 3 قدراً جيداً من الوقت
- ☐ 4 بعض الوقت
- ☐ 5 قليلاً من الوقت
- ☐ 6 وقت قليل جداً
- ☐ 7 لاشئ من الوقت

9. إلى أي مدى خلال الأسبوعين الماضيين شعرت بضيق في التنفس و انت تقوم بأنشطتك البدنية اليوميه؟

- ☐ 1 ضيق شديد في التنفس
- ☐ 2 جدا ضيق في التنفس
- ☐ 3 قدراً لا بأس به من ضيق التنفس
- ☐ 4 ضيق تنفس متوسط
- ☐ 5 بعض الضيق في التنفس
- ☐ 6 ضيق تنفس ضئيل
- ☐ 7 لا يوجد ضيق تنفس

Patient ID ☐ **File No.** ☐

10. كم من المرات في الأسبوعين الماضيين أحسست بأنك على وشك البكاء أو لك الرغبة في البكاء؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

11. كم مره خلال الأسبوعين الماضيين شعرت بانك اكثر اعتماداً على الأخرين مقارنة بقبل مشكلة قلبك؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

12. كم مر خلال الأسبوعين الماضيين شعرت بأنك غير قادر بأداء نشاطاتك الأجتماعيه المعتادة او النشاطات الأجتماعيه مع عائلتك؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

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Patient ID [ ]   File No. [ ]

13. كم مر خلال الأسبوعين الماضيين شعرت كما لو ان الأخرين لم يعد لديهم نفس الثقه فيك مقارنة بقبل مشكلة قلبك ؟

1 ☐ طوال الوقت
2 ☐ معظم الوقت
3 ☐ قدراً جيداً من الوقت
4 ☐ بعض الوقت
5 ☐ قليلاً من الوقت
6 ☐ وقت قليل جداً
7 ☐ لاشئ من الوقت

14. كم مر خلال الأسبوعين الماضيين شعرت بألم في الصدر اثناء قيامك بأداء اعمالك اليوميه المعتاده؟

1 ☐ طوال الوقت
2 ☐ معظم الوقت
3 ☐ قدراً جيداً من الوقت
4 ☐ بعض الوقت
5 ☐ قليلاً من الوقت
6 ☐ وقت قليل جداً
7 ☐ لاشئ من الوقت

15. كم مر خلال الأسبوعين الماضيين شعرت بانك غير متأكد من نفسك او بنقص في الثقه بالنفس؟

1 ☐ طوال الوقت
2 ☐ معظم الوقت
3 ☐ قدراً جيداً من الوقت
4 ☐ بعض الوقت
5 ☐ قليلاً من الوقت
6 ☐ وقت قليل جداً
7 ☐ لاشئ من الوقت

Patient ID [ ] **File No.** [ ]

16. كم مر خلال الأسبوعين الماضيين انزعجت بسبب الم او تعب الساقين؟

1 ☐ طوال الوقت
2 ☐ معظم الوقت
3 ☐ قدراً جيداً من الوقت
4 ☐ بعض الوقت
5 ☐ قليلاً من الوقت
6 ☐ وقت قليل جداً
7 ☐ لاشئ من الوقت

17. في الأسبوعين الماضيين كم من الوقت أحسست بأنك ذو طاقة محدودة لكي تقوم بأى رياضة أو تمرين كنتيجة لمرض قلبك ؟

1 ☐ محدوداً للغايه
2 ☐ محدوداً جداً
3 ☐ قدراً لا بأس
4 ☐ متوسط المحدودية
5 ☐ محدوداً إلى حد ما
6 ☐ محدوداً قليلاً
7 ☐ غير محدود على الاطلاق.

18. كم مر خلال الأسبوعين الماضيين شعرت بالقلق أوالخوف؟

1 ☐ طوال الوقت
2 ☐ معظم الوقت
3 ☐ قدراً جيداً من الوقت
4 ☐ بعض الوقت
5 ☐ قليلاً من الوقت
6 ☐ وقت قليل جداً
7 ☐ لاشئ من الوقت

Patient ID ☐ **File No.** ☐

19. كم مره خلال الأسبوعين الماضيين شعرت بدوخه او دوار؟

1 ☐ طوال الوقت
2 ☐ معظم الوقت
3 ☐ قدراً جيداً من الوقت
4 ☐ بعض الوقت
5 ☐ قليلاً من الوقت
6 ☐ وقت قليل جداً
7 ☐ لاشئ من الوقت

20. بشكل عام, ألى أي مدى خلال الأسبوعين الماضيين كنت مقيد ومحدود وذالك نتيجة مشكلة قلبك؟

1 ☐ محدوداً للغايه
2 ☐ محدوداً جداً
3 ☐ قدراً لا بأس
4 ☐ متوسط المحدودية
5 ☐ محدوداً إلى حد ما
6 ☐ محدوداً قليلاً
7 ☐ غير محدود على الاطلاق.

21. كم من المرات في الأسبوعين الماضيين أحسست بأنك غير متأكد من حجم التمارين الرياضية أو النشاطات البدنية التى تستطيع القيام بها ؟

1 ☐ طوال الوقت
2 ☐ معظم الوقت
3 ☐ قدراً جيداً من الوقت
4 ☐ بعض الوقت
5 ☐ قليلاً من الوقت
6 ☐ وقت قليل جداً
7 ☐ لاشئ من الوقت

7

Patient ID [ ] **File No.** [ ]

22. كم من المرات في الأسبوعين الماضيين أحسست أن عائلتك كانت تحميك بشكل أكثر من اللازم ؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

23. كم مر خلال الأسبوعين الماضيين شعرت كما لو انك عبأ على الأخرين؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

24. كم مر خلال الأسبوعين الماضيين شعرت بانك مستثنى من القيام ببعض الأشياء مع ناس اخرين وذالك نتيجةً مشكلة قلبك؟

☐1 طوال الوقت
☐2 معظم الوقت
☐3 قدراً جيداً من الوقت
☐4 بعض الوقت
☐5 قليلاً من الوقت
☐6 وقت قليل جداً
☐7 لاشئ من الوقت

8

Patient ID ☐ **File No.** ☐

25. كم مر خلال الأسبوعين الماضيين شعرت بأنك غير قادر على لأختلاط الأجتماعي وذلك نتيجة مشكلة قلبك؟

1 ☐ طوال الوقت
2 ☐ معظم الوقت
3 ☐ قدراً جيداً من الوقت
4 ☐ بعض الوقت
5 ☐ قليلاً من الوقت
6 ☐ وقت قليل جداً
7 ☐ لاشئ من الوقت

26. بشكل عام في الأسبوعين الماضيين الى أي مدى أحسست بأنك مقيد أو محدود التصرف بسبب مشكلة قلبك ؟

1 ☐ محدوداً للغايه
2 ☐ محدوداً جداً
3 ☐ قدراً لا بأس
4 ☐ متوسط المحدودية
5 ☐ محدوداً إلى حد ما
6 ☐ محدوداً قليلاً
7 ☐ غير محدود على الاطلاق.

هذه هي النهايه شكرا جزيلاً على إجابتك على الأسئلة

APPENDIX F: PERMISSION TO BORROW MACNEW HEART DISEASE HEALTH-RELATED QUALITY OF LIFE QUESTIONNAIRE

- MacNew translation into Saudi

Stefan Höfer
11/21/2010
To: Hawazen Rawas
Cc: neilb@uwm.edu, ra.clark@qut.edu.au

Dear Hawazen,
that sound's good. Please go ahead with the first steps.

1. Find two people who are fully bilingual in Saudi Arabic and English; one of them should be a health professional the other NOT a health professional.

2. Ask each to independently translate the English MacNew into Saudi Arabic. They also need to translate the response sets noting that there are only 5 response sets as these are repeated for different items. Using the same questionnaire format as the original English MacNew will help greatly when we prepare the final questionnaire.

3. Find two DIFFERENT people [one again a health professional the other NOT] to back translate the translations into English.

3. Send each English back-translation to me. I will check each against the English MacNew and determine the accuracy of the translation for each of the items in the MacNew.

Looking forward hearing back from you soon,

best wishes

Stefan

Dr. Stefan Höfer [PhD, MSc, FESC]
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A-6020 Innsbruck
Tel: +43-512-504-26227
Fax: +43-512-504-26232
email: stefan.hoefer@i-med.ac.at
http://www.macnew.org

APPENDIX G: THE SHORT FORM SF-36 HEALTH SURVEY

حالتك الصحية العامة

يستفسر هذا الاستبيان عن وجهة نظرك في صحتك. هذه المعلومات سوف تساعد على تتبع ما تشعر به ومدى قدرتك على أداء نشاطاتك المعتادة. *نشكرك على الإجابة عن هذه الأسئلة!*

لكل سؤال من الأسئلة التالية يرجى وضع علامة ☒ في المربع الخاص بالإجابة التي تصف بشكل أفضل ما تشعر به.

1. بشكل عام، هل تعتبر أن صحتك:

ممتازة	جيدة جدًا	جيدة	لا بأس بها	ضعيفة
1☐	2☐	3☐	4☐	5☐

2. مقارنة بالعام الماضي، كيف تقيِّم صحتك الآن بشكل عام؟

أفضل بكثير الآن من العام الماضي	أفضل إلى حد ما الآن من العام الماضي	تقريبًا مثل العام الماضي	أسوأ إلى حد ما الآن من العام الماضي	أسوأ بكثير الآن من العام الماضي
1☐	2☐	3☐	4☐	5☐

3. الأسئلة التالية تدور حول النشاطات التي قد تقوم بها أثناء يوم عادي. هل <u>صحتك الآن تحدّ من قدرتك</u> على القيام بالنشاطات التالية؟ إن كانت كذلك، فإلى أي حد؟

	نعم تحدّها كثيرًا	نعم تحدّها قليلا	لا، لا تحدّها أبدًا
أ. <u>النشاطات العنيفة</u> مثل الركض ورفع الأشياء الثقيلة والمشاركة في رياضات شاقة	☐ 1	☐ 2	☐ 3
ب. <u>النشاطات المعتدلة</u> مثل تحريك طاولة أو دفع مكنسة كهربائية، أو لعب البولينغ أو البلياردو	☐ 1	☐ 2	☐ 3
ج. رفع أو حمل كيس مشتريات البقالة	☐ 1	☐ 2	☐ 3
د. صعود الدرج <u>لعدة</u> طوابق	☐ 1	☐ 2	☐ 3
ه. صعود الدرج <u>لطابق واحد</u>	☐ 1	☐ 2	☐ 3
و. الانحناء أو الركوع أو جلوس القرفصاء	☐ 1	☐ 2	☐ 3
ز. المشي لمسافة تزيد عن <u>كيلومتر واحد</u>	☐ 1	☐ 2	☐ 3
ح. المشي <u>لبضع مئات من الأمتار</u>	☐ 1	☐ 2	☐ 3
ط. المشي <u>لمسافة مائة متر</u>	☐ 1	☐ 2	☐ 3
ي. الاستحمام أو ارتداء الملابس بنفسك	☐ 1	☐ 2	☐ 3

4. خلال الأسابيع الأربعة الماضية، كم من الوقت حصلت معك أي من المشاكل التالية خلال تأدية عملك أو نشاطاتك اليومية العادية الأخرى كنتيجة لصحتك الجسدية؟

	كل الوقت	معظم الوقت	بعض الوقت	قليل من الوقت	أبدًا
أ. خفّفت من مقدار الوقت الذي تقضيه في العمل أو النشاطات الأخرى	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ب. أنجزت أقل مما كنت تريد	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ج. كنت محدوداً في نوع العمل أو النشاطات الأخرى	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
د. وجدت صعوبة في القيام بعملك أو أداء نشاطات أخرى (على سبيل المثال، أخذت منك مجهودًا إضافيًا)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

5. خلال الأسابيع الأربعة الماضية، كم من الوقت حصلت معك أي من المشاكل التالية خلال تأدية عملك أو نشاطاتك اليومية المعتادة الأخرى كنتيجة لمشاكل عاطفية (مثل شعورك بالكآبة أو القلق)؟

	كل الوقت	معظم الوقت	بعض الوقت	قليل من الوقت	أبدًا
أ. خفّفت من مقدار الوقت الذي تقضيه في العمل أو النشاطات الأخرى	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ب. أنجزت أقل مما كنت تريد	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ج. أديت العمل أو النشاطات الأخرى باهتمام أقل من المعتاد	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

6. خلال الأسابيع الأربعة الماضية، إلى أي مدى تعارضت صحتك الجسدية أو مشاكلك العاطفية مع نشاطاتك الاجتماعية العادية مع الأسرة، أو الأصدقاء، أو الجيران أو مجموعات أخرى من الناس؟

لم تتعارض أبدًا	تعارضت بشكل قليل	تعارضت بشكل متوسط	تعارضت بشكل كبير	تعارضت بشكل كبير جدًا
▼	▼	▼	▼	▼
1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

7. ما مدى شدة الأوجاع الجسدية التي شعرت بها خلال الأسابيع الأربعة الماضية؟

لا أوجاع	خفيفة جدًا	خفيفة	متوسطة	حادة	حادة جدًا
▼	▼	▼	▼	▼	▼
1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐

8. خلال الأسابيع الأربعة الماضية، إلى أي مدى تعارض الألم مع عملك العادي (بما في ذلك عملك خارج المنزل والعمل المنزلي)؟

لم يتعارض أبدًا	تعارض بشكل قليل	تعارض بشكل متوسط	تعارض بشكل كبير	تعارض بشكل كبير جدًا
▼	▼	▼	▼	▼
1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

.9 هذه الأسئلة تدور حول ما تشعر به وكيف سارت الأمور معك خلال الأسابيع الأربعة الماضية. الرجاء إعطاء إجابة واحدة عن كل سؤال بحيث تكون الأقرب لما كنت تشعر به. كم من الوقت خلال الأسابيع الأربعة الماضية...

	كل الوقت	معظـم الوقت	بعـض الوقت	قليـل من الوقت	أبدًا
أ. هل شعرت بأنك مفعم بالحيوية؟	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ب. هل كنت متوتراً جداً؟	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ج. هل أحسست أنك محبط لدرجة أن لا شيء ممكن أن يبهجك؟	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
د. هل أحسست بالهدوء والطمأنينة؟	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ه. هل كانت لديك طاقة كبيرة؟	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
و. هل أحسست بالحزن والاكتئاب؟	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ز. هل شعرت بأنك مُرهَق جداً؟	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ح. هل كنت سعيداً؟	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ط. هل شعرت بأنك متعب؟	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

.10 خلال الأسابيع الأربعة الماضية، كم من الوقت تعارضت صحتك الجسدية أو مشاكلك العاطفية مع نشاطاتك الاجتماعية (مثل زيارة الأصدقاء والأقارب، إلخ...)؟

كل الوقت	معظـم الوقت	بعـض الوقت	قليـل من الوقت	أبدًا
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

11. ما مدى صحة أو خطأ كل عبارة من العبارات التالية بالنسبة لك؟

	صحيح بالتأكيد	صحيح غالبًا	لا أعرف	خطأ غالبًا	خطأ بالتأكيد
أ. يبدو أنني أمرض بسهولة أكثر بقليل من الآخرين	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ب. أنا على نفس القدر من الصحة كالآخرين الذين أعرفهم	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ج. أتوقع أن تسوء صحتي	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
د. صحتي ممتازة	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

شكرًا على الإجابة عن هذه الأسئلة!

APPENDIX H: PERMISSION TO BORROW THE SHORT FORM SF-36 HEALTH SURVEY

QualityMetric Incorporated

APPENDIX B

LICENSE AGREEMENT - DETAILS

Licensee:	Queensland University of Technology (Hawazen Omar Rawas victoria park Rd, kelvin Grove campus/ queensland university of technology Brisbane, QLD 4059	License Number:	QM008968
		Amendment to:	N/A
		License Term:	07/01/11 to 06/30/12

Approved Purpose
An evaluating of evidence based practice, quality of life, and the barriers to secondary prevention and self-management for Saudi Arabian patients af

Licensed Surveys (Modes) and Services:

Item	Description	Mode of Admin	Quantity
PROJ01	Project Registration	Paper	1
ADM012	Patients Enrolled		60
ADMINS	Administrations		60
ES0220	SF-36v2, Standard Recall	Paper	1

Approved Languages:
Saudi Arabia (Arabic)

SS040	Scoring Software v4		1
SS047	SS v4 Key: SF-36v2		60
EM020	SF-36v2 Clinical Trial Guide eManual		1

Approved Languages:
United States (English)

TOTAL FEES: **0.00 USD**

APPENDIX I: LOCAL ETHICS APPROVAL

Ministry of Health

Kingdom of Saudi Arabia
Directorate of Health Affairs – Jeddah
Research Center

Date: 16. May. 2012

To: Queensland University of Technology, Brisbane, Australia.

Subject: Ethical Approval of Research Proposal.

This is to certify that research proposal titled:

"A multi-level Examination of Secondary Prevention Practices for Saudi People Following a Recent cardiac event"

Submitted by: " **DR. Hawazen O Rawas** " was reviewed by the research and ethics committee **(H-02-J-002)** with respect to protecting of the rights of human subject involved in the research project.

I am pleased to inform you that the committee approved the above mentioned Proposal as fulfilling the ethical requirement.

Please submit to the research center your progress report.

Best Regard.

Dr / Hanan Alattas (M.D)
Head of Research Center - Jeddah

Dr / Osama Obaid Dhafar (M.D)
Asst. Director of Directorate
Of Health Affairs, Jeddah
Head of Research Committee - Jeddah

APPENDIX J: LETTER OF ACCEPTANCE FROM HOSPITAL

KING FAHAD HOSPITAL JEDDAH

Dr. Eman M. Ashgar, Consultant non-invasive cardiologist

King Fahd Hospital, Jeddah

Ministry of Health

Tel: (+966)505843640

Email: dremashgar@yahoo.com

Date: 2nd, June, 2011

To whom it may concern:

I am pleased to advice that as a formal medical staff member of King Fahd Hospital, Hawazen Omar, the PhD student of QUT, will receive all the best supports from me in the clinic and the hospital staff, during the time of conducting her research project.

Please do not hesitate to contact me if you have any further enquires.

Yours sincerely,

Dr. Eman Ashgar
Consultant Cardiologist

5/June/2011

Dr. Eman Ashgar

APPENDIX K: QUT ETHICS APPROVAL

QUT

University Human Research Ethics Committee

HUMAN ETHICS APPROVAL CERTIFICATE

NHMRC Registered Committee Number EC00171

Date of Issue: 23/7/12 (supersedes all previously issued certificates)

Dear Mrs Hawazen Rawas

A UHREC should clearly communicate its decisions about a research proposal to the researcher and the final decision to approve or reject a proposal should be communicated to the researcher in writing. This Approval Certificate serves as your written notice that the proposal has met the requirements of the *National Statement on Research involving Human Participation* and has been approved on that basis. You are therefore authorised to commence activities as outlined in your proposal application, subject to any specific and standard conditions detailed in this document.

Within this Approval Certificate are:

* Project Details
* Participant Details
* Conditions of Approval (Specific and Standard)

Researchers should report to the UHREC, via the Research Ethics Coordinator, events that might affect continued ethical acceptability of the project, including, but not limited to:

(a) serious or unexpected adverse effects on participants; and
(b) proposed significant changes in the conduct, the participant profile or the risks of the proposed research.

Further information regarding your ongoing obligations regarding human based research can be found via the Research Ethics website http://www.research.qut.edu.au/ethics/ or by contacting the Research Ethics Coordinator on 07 3138 2091 or ethicscontact@qut.edu.au

If any details within this Approval Certificate are incorrect please advise the Research Ethics Unit within 10 days of receipt of this certificate.

Project Details

Category of Approval: Human non-HREC

Approved From: 11/07/2012 **Approved Until:** 11/07/2015 (subject to annual reports)

Approval Number: 1200000304

Project Title: A multi-level examination of secondary prevention practices for Saudi people following a recent cardiac event

Experiment Summary: Examine the provision of secondary prevention practices for Saudi people who have experienced a recent cardiac event, and will also help in the understanding of Saudi patient's feelings and behaviours about such practices.

Investigator Details

Chief Investigator: Mrs Hawazen Rawas

Other Staff/Students:

Investigator Name	Type	Role
Dr Karen Theobald	Internal	Supervisor
Prof Patsy Yates	Internal	Supervisor

Participant Details

Participants:
Approximately 360

Location/s of the Work:
King Fahd Hospital, Kingdom of Saudi Arabia

RM Report No. E801 Version 4

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University Human Research Ethics Committee

HUMAN ETHICS APPROVAL CERTIFICATE

NHMRC Registered Committee Number EC00171

Date of Issue: 23/7/12 (supersedes all previously issued certificates)

Conditions of Approval

Specific Conditions of Approval:
No special conditions placed on approval by the UHREC. Standard conditions apply.

Standard Conditions of Approval:
The University's standard conditions of approval require the research team to:

1. Conduct the project in accordance with University policy, NHMRC / AVCC guidelines and regulations, and the provisions of any relevant State / Territory or Commonwealth regulations or legislation;

2. Respond to the requests and instructions of the University Human Research Ethics Committee (UHREC);

3. Advise the Research Ethics Coordinator immediately if any complaints are made, or expressions of concern are raised, in relation to the project;

4. Suspend or modify the project if the risks to participants are found to be disproportionate to the benefits, and immediately advise the Research Ethics Coordinator of this action;

5. Stop any involvement of any participant if continuation of the research may be harmful to that person, and immediately advise the Research Ethics Coordinator of this action;

6. Advise the Research Ethics Coordinator of any unforeseen development or events that might affect the continued ethical acceptability of the project;

7. Report on the progress of the approved project at least annually, or at intervals determined by the Committee;

8. (Where the research is publicly or privately funded) publish the results of the project is such a way to permit scrutiny and contribute to public knowledge; and

9. Ensure that the results of the research are made available to the participants.

Modifying your Ethical Clearance:
Requests for variations must be made via submission of a Request for Variation to Existing Clearance Form (http://www.research.qut.edu.au/ethics/forms/hum/var/var.jsp) to the Research Ethics Coordinator. Minor changes will be assessed on a case by case basis.

It generally takes 7-14 days to process and notify the Chief Investigator of the outcome of a request for a variation.

Major changes, depending upon the nature of your request, may require submission of a new application.

Audits:
All active ethical clearances are subject to random audit by the UHREC, which will include the review of the signed consent forms for participants, whether any modifications / variations to the project have been approved, and the data storage arrangements.

End of Document

RM Report No. E801 Version 4

Page 2 of 2

APPENDIX L: PARTICIPANTS CONSENT FORM

Queensland University of Technology
Brisbane Australia

CONSENT FORM FOR QUT RESEARCH PROJECT

Questionnaire and Interview – Pilot Study

A Multi-Level Examination of Secondary Prevention Practices for Saudi People Following a Recent Cardiac Event

QUT Ethics Approval Number 1200000304

RESEARCH TEAM CONTACTS

Hawazen Rawas – Principal researcher
School of Nursing – Faculty of Health – QUT
+966 550 099 624 +61 7 3138 3269
hawazen.rawas@student.qut.edu.au

Karen Theobald – Research supervisor
School of Nursing – Faculty of Health – QUT
+61 7 3138 3904
k.theobald@qut.edu.au

STATEMENT OF CONSENT

By signing below, you are indicating that you:

- Have read and understood the information document regarding this project.
- Have had any questions answered to your satisfaction.
- Understand that the researcher will be accessing your health files to collect information relevant to the research.
- Understand that if you have any additional questions you can contact the research team.
- Understand that you are free to withdraw at any time, without comment or penalty.
- Understand that you can contact the Research Ethics Unit on +61 7 3138 5123 or email ethicscontact@qut.edu.au if you have concerns about the ethical conduct of the project.
- Agree to participate in the project.

Name ______________________________

Signature ______________________________

Date ____________________

Please return this sheet to the investigator.

Queensland University of Technology
Brisbane Australia

CONSENT FORM FOR QUT RESEARCH PROJECT
Questionnaire and Interview –Main Study

A Multi-Level Examination of Secondary Prevention Practices for Saudi People Following a Recent Cardiac Event

QUT Ethics Approval Number 1200000304

RESEARCH TEAM CONTACTS

Hawazen Rawas – Principal researcher
School of Nursing – Faculty of Health – QUT
+966 550 099 624 +61 7 3138 3269
hawazen.rawas@student.qut.edu.au

Karen Theobald – Research supervisor
School of Nursing – Faculty of Health – QUT
+61 7 3138 3904
k.theobald@qut.edu.au

STATEMENT OF CONSENT

By signing below, you are indicating that you:

- Have read and understood the information document regarding this project.
- Have had any questions answered to your satisfaction.
- Understand that the researcher will be accessing your health files to collect information relevant to the research.
- Understand that if you have any additional questions you can contact the research team.
- Understand that you are free to withdraw at any time, without comment or penalty.
- Understand that you can contact the Research Ethics Unit on +61 7 3138 5123 or email ethicscontact@qut.edu.au if you have concerns about the ethical conduct of the project.
- Agree to participate in the project.

Name ______________________________

Signature ______________________________

Date ____________________

Please return this sheet to the investigator.

Queensland University of Technology
Brisbane Australia

WITHDRAWAL OF CONSENT FOR QUT RESEARCH PROJECT

A Multi-Level Examination of Secondary Prevention Practices for Saudi People Following a Recent Cardiac Event

QUT Ethics Approval Number 1200000304

RESEARCH TEAM CONTACTS

Hawazen Rawas – Principal researcher
School of Nursing – Faculty of Health – QUT
+966 550 099 624 +61 7 3138 3269
hawazen.rawas@student.qut.edu.au

Karen Theobald – Research supervisor
School of Nursing – Faculty of Health – QUT
+61 7 3138 3904
k.theobald@qut.edu.au

I hereby wish to WITHDRAW my consent to participate in the research project named above.

I understand that this withdrawal WILL NOT jeopardise my relationship with Queensland University of Technology.

Name ______________________________

Signature ______________________________

Date ______________________

APPENDIX M: PARTICIPANTS INFORMATION SHEET

Queensland University of Technology
Brisbane Australia

PARTICIPANT INFORMATION FOR QUT RESEARCH PROJECT
Questionnaire and Interview – Pilot Study

A Multi-Level Examination of Secondary Prevention Practices for Saudi People Following a Recent Cardiac Event

QUT Ethics Approval Number 1200000304

RESEARCH TEAM

Principal Researcher:	Hawazen Rawas, PhD student, Queensland University of Technology (QUT)
Associate Researchers:	Dr Karen Theobald and Prof Patsy Yates, QUT Supervisors

DESCRIPTION

This project is being undertaken as part of a PhD degree by Hawazen Rawas.

This is the pilot phase of the main study which will examine the provision of practices aimed at preventing the recurrences of cardiovascular events or complications of these diseases for Saudi people who have experienced a recent cardiac event through cardiac support services. Also the study will help in the understanding of Saudi patients' feelings and behaviours about such services. The first objective of this study is to describe the patients' characteristics and health related quality of life of patients in Saudi Arabia who have had a recent cardiac event. The second objective is to describe patient knowledge, attitudes and behaviours relating to engagement in services following a cardiac event. The third objective is to describe the current practices in Saudi Arabian health services for a patient who has had a cardiac event within the previous three to six months as documented in the medical records.

The research team requests your assistance because you are a Saudi patient and you have experienced a recent cardiac event.

PARTICIPATION

Your participation in this pilot study will involve the following at one of the hospital cardiac clinics:

- Completing three (3) questionnaires (the MacNew, SF-36 and PREMISE questionnaire), each of which will take approximately 10 minutes of your time to complete.
- Allowing the research team access to your health file so that they can obtain information on the prevention care that you received in your health care services.
- Answering some questions, when you are at the hospital and then over the phone, about the care you received from the health services. These interviews will take approximately 40 minutes of your time in total.

Questionnaires:

The MacNew and SF-36 questionnaires will assess your health quality of life after a recent cardiac event. The MacNew questionnaire will ask you about your health quality of life in the previous two weeks (e.g. "In general, how much of the time during the last 2 weeks have you felt frustrated, impatient or angry"?) and the SF-36 questionnaire will ask you about your health quality of life in the previous four weeks (e.g. "Comparing with the previous year, how you evaluate your health now"?). The PREMISE questionnaire will then ask you about your understanding of the prevention programs for people who have experienced a cardiac event (e.g. "Do you know that you should eat less oily and fatty foods"?).

Health File, Interview and Phone call:

Your patient health files will only be accessed to obtain information on the prevention care that you received in your health care services. You will then be asked some questions about the care you received from the Saudi Arabian health services, and in particular about the three key phases of your care as an in-patient, out-patient and any further ongoing care practices that occur.

Within two weeks of the interview at the hospital clinic, you will be telephoned and asked some questions to further assist our understanding of your health status and your knowledge of practices aimed at preventing the recurrence of cardiovascular events or complications of these diseases. These questions will be similar to the MacNew and PREMISE questionnaires.

Your participation in this project is entirely voluntary. If you do agree to participate, you can withdraw from the project without comment or penalty. Any identifiable information already obtained from you will be destroyed. Your decision to participate or not participate will in no way impact upon your current or future relationship with any Saudi Hospitals. If you agree to participate you do not have to complete any question(s) that you are uncomfortable answering.

EXPECTED BENEFITS

It is expected that this project will not directly benefit you. However, it may result in the improvement of health care services in Saudi Arabia.

To recognise your important contribution should you choose to participate, you will be given a brochure translated from the Australian Heart Foundation guidelines on secondary prevention after a cardiac event and a letter thanking you for your contribution.

RISKS

Please note that if you participate in this project you might feel emotional or anxious during, or some time following, the completion of the questionnaires. These emotions may be related to your experiences of your past cardiac events.

A plan for risk management will include ongoing assessment of your comfort level. Your participation in the study is voluntary and you may withdraw from the study at any time without penalty. Where discomfort is significant and ongoing there are counselling services available at the King Fahd Hospital, in an office in the cardiac ward, just telephone +966 2 6606 111 and ask for extension 7081.

PRIVACY AND CONFIDENTIALITY

All comments and responses will be treated confidentially and will be made anonymous when transcribed. The names of individual persons will not be included in any of the responses.

The data you supply will only be used for research purposes. Only the researcher and her supervisory team will have access to the data. No names or other identifiers such as place of treatment or geographic region will appear in the presented data.

CONSENT TO PARTICIPATE

We would like to ask you to sign a written consent form (following) to confirm your agreement to participate.

QUESTIONS / FURTHER INFORMATION ABOUT THE PROJECT

If have any questions or require any further information please contact one of the research team members below.

Hawazen Rawas – Principal researcher
School of Nursing – Faculty of Health – QUT
+966 550 099 624 +61 7 3138 3269
hawazen.rawas@student.qut.edu.au

Karen Theobald – Research supervisor
School of Nursing – Faculty of Health – QUT
+61 7 3138 3904
k.theobald@qut.edu.au

CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE PROJECT

QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the project you may contact the QUT Research Ethics Unit on +61 7 3138 5123 or email ethicscontact@qut.edu.au. The QUT Research Ethics Unit is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

Thank you for helping with this research project. Please keep this sheet for your information.

Queensland University of Technology
Brisbane Australia

PARTICIPANT INFORMATION FOR QUT RESEARCH PROJECT

Questionnaire and Interview –Main Study

A Multi-Level Examination of Secondary Prevention Practices for Saudi People Following a Recent Cardiac Event

QUT Ethics Approval Number 1200000304

RESEARCH TEAM

Principal Researcher:	Hawazen Rawas, PhD student, Queensland University of Technology (QUT)
Associate Researchers:	Dr Karen Theobald and Prof Patsy Yates, QUT Supervisors

DESCRIPTION

This project is being undertaken as part of a PhD degree by Hawazen Rawas.

This main study will examine the provision of practices aimed at preventing the recurrences of cardiovascular events or complications of these diseases for Saudi people who have experienced a recent cardiac event through cardiac support services. Also the study will help in the understanding of Saudi patients' feelings and behaviours about such services. The first objective of this study is to describe the patients' characteristics and health related quality of life of patients in Saudi Arabia who have had a recent cardiac event. The second objective is to describe patient knowledge, attitudes and behaviours relating to engagement in services following a cardiac event. The third objective is to describe the current practices in Saudi Arabian health services for a patient who has had a cardiac event in the previous three to six months as documented in the medical records.

The research team requests your assistance because you are a Saudi patient and you have experienced a recent cardiac event.

PARTICIPATION

Your participation in this main study will involve the following at one of the hospital cardiac clinics:

- Completing two (2) questionnaires (the MacNew and PREMISE questionnaire), each of which will take approximately 10 minutes of your time to complete.

- Allowing the research team access to your health file so that they can obtain information on the prevention care that you received in your health care services.

- Answering some questions, when you are at hospital, about the care you received from the health services. These interviews will take approximately 30 minutes of your time in total.

Questionnaires:

The MacNew questionnaire will assess your health quality of life in the previous two weeks after a recent cardiac event, (e.g. "In general, how much of the time during the last 2 weeks have you felt frustrated, impatient or angry"?). The PREMISE questionnaire will then ask you about your understanding of the prevention programs for people who have experienced a cardiac event (e.g. "Do you know that you should eat less oily and fatty foods"?).

Health File and Interview:

Your patient health files will only be accessed to obtain information on the prevention care that you received in your health care services. You will then be asked some questions about the care you received from the Saudi Arabian health services, and in particular about the three key phases of your care as an in-patient, out-patient and any further ongoing care practices that occur.

Your participation in this project is entirely voluntary. If you do agree to participate, you can withdraw from the project without comment or penalty. Any identifiable information already obtained from you will be destroyed. Your decision to participate or not participate will in no way impact upon your current or future relationship with any Saudi Hospitals. If you agree to participate you do not have to complete any question(s) that you are uncomfortable answering.

EXPECTED BENEFITS

It is expected that this project will not directly benefit you. However, it may result in the improvement of health care services in Saudi Arabia.

To recognise your important contribution should you choose to participate, you will be given a brochure translated from the Australian Heart Foundation guidelines on secondary prevention after a cardiac event and a letter thanking you for your contribution.

RISKS

Please note that if you participate in this project you might feel emotional or anxious during, or some time following the completion of the questionnaires. These emotions may be related to your experiences of your past cardiac events.

A plan for risk management will include ongoing assessment of your comfort level. Your participation in the study is voluntary and you may withdraw from the study at any time without penalty. Where discomfort is significant and ongoing there are counselling services available at the King Fahd Hospital in an office in the cardiac ward, just telephone +966 2 6606 111 and ask for extension 7081.

PRIVACY AND CONFIDENTIALITY

All comments and responses will be treated confidentially and will be made anonymous when transcribed. The names of individual persons will not be included in any of the responses.

The data you supply will only be used for research purposes. Only the researcher and her supervisory team will have access to the data. No names or other identifiers such as place of treatment or geographic region will appear in the presented data.

CONSENT TO PARTICIPATE

We would like to ask you to sign a written consent form (following) to confirm your agreement to participate.

QUESTIONS / FURTHER INFORMATION ABOUT THE PROJECT

If have any questions or require any further information please contact one of the research team members below.

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CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE PROJECT

QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the project you may contact the QUT Research Ethics Unit on +61 7 3138 5123 or email ethicscontact@qut.edu.au. The QUT Research Ethics Unit is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

Thank you for helping with this research project. Please keep this sheet for your information.